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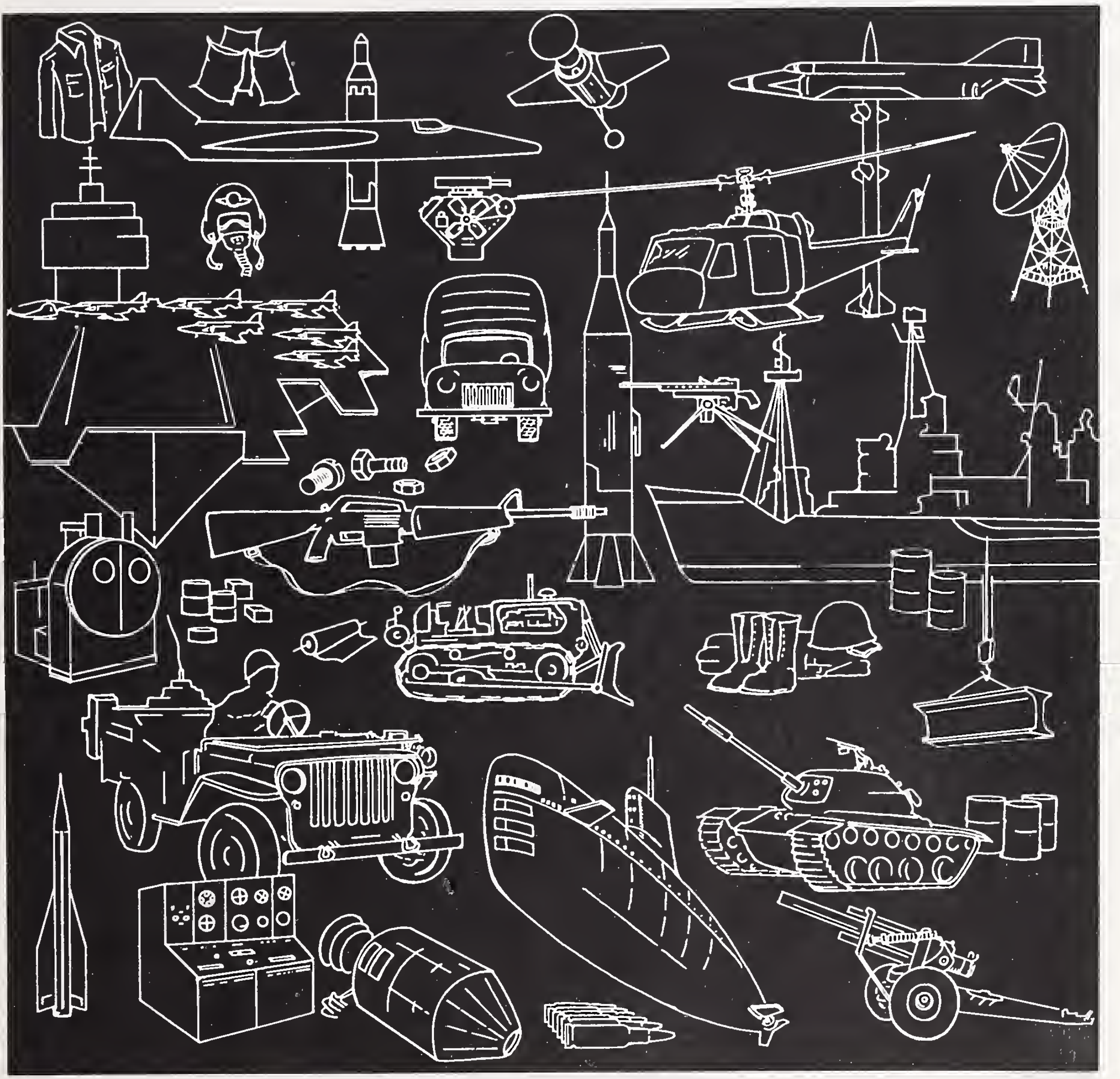

DEFENSE CONTRACT ADMINISTRATION SERVICES

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The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Editor. Telephone queries: (202) OXford 5-2709.

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BULLETIN

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DCAS Comes of Age

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Major General John A. Goshorn, USA

The "Boots - Boots" of Rudyard Kipling are still "movin' up and down again" in Vietnam. But they are hardly the same boots. To meet conditions in Vietnam, a new moulded boot with laminated steel insole and nylon uppers had to be developed. So it has been with the thousand of items of logistic materiel such as landing mat, food, uniform, tents, weapons and ammunition which are needed by our Armed Forces.

This part of logistic support is the heart of the mission of the Defense Contract Administration Services (DCAS) of the Defense Supply Agency. DCAS is the link between industry and the soldier, sailor, marine and airman for whom the goods are designed. This organization often provides that last chance to make certain that the combat item is going to be where it is needed on time and will do the job for which it was designed.

In FY 1967, defense prime contract awards totaled $41.8 billion. The task of converting those dollars into the best available equipment and support, while at the same time keeping defense expenditure to the minimum essential, absorbs the thought and energies of many thousands in Government and many thousands more in industry. The strength and efficiency of the government/industry team is well known. It has served the nation well, and the establishment of DCAS was another step toward making the team even stronger. Until the recent past the facts of time and space gave us a measure of insulation from potential enemies. When emergencies arose, there was always time to mobilize industry and bring its full weight to bear on the problems of military production. Each Military Service hastened to establish its own buying capability and to place contracts with industry as rapidly as possible. The emphasis was naturally on production, and there was little time to deal with the problems of contract administration, or to resolve the often divergent interests of the Services.

When the emergencies passed, the defense industry disappeared and there was little inclination to seek a permanent solution to what was generally considered to be a transient problem.

The world environment today is quite different. Time and space have shrunk. Expenditures for military goods have remained high. The defense/industry relationship has matured and the DCAS organization reflects the maturity, complexity and sophistication which the problems of today demand.

Maj. Gen. John A. Goshorn, USA, is Deputy Director for Contract Administration Services of the Defense Supply Agency. Prior to assuming his present assignment in August 1966, Gen. Goshorn served as Director of Procurement, Office of Assistant Secretary of the Army (Installations & Logistics); and Deputy Director of Procurement and Production, U.S. Army Materiel Command.

If a point in time were to be selected when it finally became apparent that there might be a better way for Government and industry to work together, it would probably be February 1962. At that time Assistant Secretary of Defense (Installations and Logistics) Thomas D. Morris convened a procurement management improvement conference, to which were invited the key people from all levels of industry and Government having a stake in defense procurement. This conference produced a wide range of recommendations to improve defense procurement. Building on these recommendations, a formal study group (Project 60) was formed and, after an exhaustive look at every aspect of procurement both within Government and industry, this group recommended that defense contract administration be centralized, essentially as it is today, under the present DCAS organization.

As reorganizations go, the creation of DCAS was accomplished with surprising speed. At every step, however, great care was taken not to force reorganization where it was not entirely justified by foreseeable benefits. Industry was kept abreast of the study as it progressed, and the Defense Industry Advisory Council (DIAC) was asked to establish its own study group to analyze the Project 60 recommendations and comment upon them. The DIAC report concluded with the following overall evaluation:

> **This is the first change proposed by the Defense Department in its procurement procedures during the past thee years which holds promise for substantially reducing contract administration work and cost both for industry and the Government.**

Since activation of DCAS less than three years ago, it has experienced rapid growth. It now administers over 80 percent of all defense contracts.

Headquarters, DCAS, at Cameron Station, Alexandria, Va., with a total personnel strength of 355, provides policy guidance and coordinates the activities of a field organization of about 24,000. This field organization is divided into 11 regions which, in turn, are divided into districts and offices. The total number of field offices is now 100. There are DCAS personnel either assigned to or regularly visiting virtually every industrial community in the country.

The volume of business has been much larger than was anticipated when the new organization was still in the planning stage. Much of this increase is, of course, directly attributable to Vietnam but, nevertheless, some of the figures are significant:

- By the end of the first full month of operation (December 1965), the number of contracts under administration was already 20 percent above the planning figure. At that time, the number of primary and secondary contracts being administered was 138,000. This is projected to increase to 276,000 by June 1968.
- In December 1965, quality assurance personnel were inspecting and releasing material for shipment at the rate of $13.7 billion annually. The annual rate projected for June 1968 is $21.7 billion. The quality assurance cost has dropped during this period from $6.37 per thousand dollars worth of goods shipped to less than $4.75 per thousand.
- Contractor invoices are being processed for payment at a rate of more than 150,000 per month. In January 1968, these payments amounted to almost $1.6 billion.

The transition from separate Service organizations to a new unified organization presented a very real challenge. Problems emerged which were significant; which demanded rapid solution; and which, while not always so, were in many instances interwoven with other problems. These included major realignment of responsibilities, new communication channels, disruption of long standing relationships between individuals, offices and industry. Added to these problems was the necessity to eliminate imbalance of skills in the work force, redistribution of manpower, and preparation and implementation of uniform procedural manuals. Any single one of these problem areas could be challenging in its own right, but in concert they were formidable. Despite the enormous task already in being, another factor contributed to the sense of urgency that had permeated DCAS for the past two years. In addition to the normal pressure on a new organization, the increased tempo of operations in Vietnam and Southeast Asia greatly magnified the number of contracts to be administered, and imposed tighter demands on adherence to delivery schedules. As the operating forces drew down existing stocks, the urgency for additional support from industry increased. The requirements for expediting action, priority production, and emergency shipments increased, while quality standards had to be maintained.

Contract administration services has been defined as:

> **Technical and administrative services in support of buying organizations performed at or near contractor establishments to facilitate contract performance and assure compliance with the terms and conditions of government contracts.**

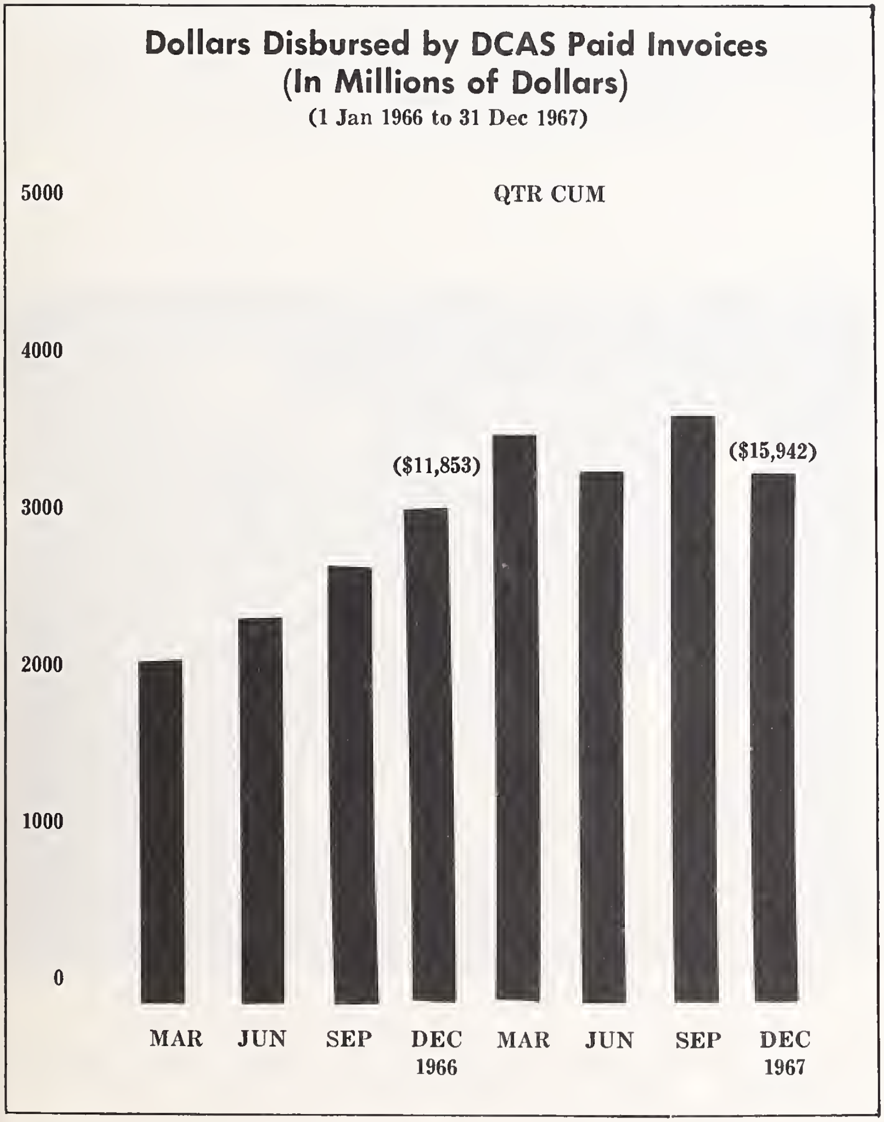
This is an oversimplification. The Project 60 Study Group was able to identify 230 separate functions which are part of contract management. The 24,000 DCAS personnel must cover a wide spectrum of these functional responsibilities. The largest group, almost 10,000 or about 44 percent of the total, are engaged in quality assurance activities. Most of the quality assurance technical people are representatives who are in day-to-day contact with the contractors. They are backed up by engineers and product specialists who are available when new or unusual problems arise. The defense products being manufactured today are so diverse and complex that many DCAS quality assurance personnel, who at one time had only one technical specialty such as electronic or mechanical commodities, now have developed a second or even a third skill. This is encouraged so that versatile, high-grade personnel are geographically dispersed to react quickly to contractor requirements.

Quality assurance representative of Defense Contract Administration Services Region, Los Angeles, at Acoustica Associates, Inc., Los Angeles, conducting an acceptance test with Acoustica's quality control manager on the Propellant Utilization System Computer used on the Atlas Agena missile.

Collectively, DCAS personnel probably constitute the nation's greatest concentration of "know how" concerning the capacity, capability and problems of American industry. DCAS management and technical personnel are on-site in contractors' plants having contracts for complex systems, such as the National Aeronautics and Space Administration man-on-the-moon life support package. A DCAS quality assurance representative in a California contractor's plant is in constant touch with the U.S. Air Force Athena program. Whether the contract is for a two-ton floating crane, certain types of aircraft, re-entry vehicles, nuclear components, chemicals, medical supplies, textiles, books, or any other commodity, there is certain to be a DCAS representative on the scene.

About one-fifth or 4,600 of DCAS personnel are performing functions grouped under the general heading of contract administration. It is basic to DCAS policy that every member adopt a "team" approach to industry. Since the contract itself provides the framework within which all aspects of the relationship must fall, the administrative contracting officer (ACO) is the logical captain of the DCAS team.

Another 3,200 people are in various production activities. The real purpose of these activities is to provide industry every possible assistance. This extends from the pre-award surveys, which seek to determine whether there are reasons that make it undesirable for a contractor to accept a contract, through effort to help with production problems, facilities problems, or any other matter having to do with the manufacture of the goods being procured.


Dollars Disbursed by DCAS Paid Invoices (In Millions of Dollars)

(1 Jan 1966 to 31 Dec 1967)

Our nation has a very real interest in maintaining as broad a defense industrial base as possible. DCAS has an obligation to seek out new producers who have a capability of producing quality materiel at competitive prices. Specifically, one of the functions assigned to field activities is "service to the public with special emphasis in obtaining Government contracts". In each DCAS Region and in most districts, there are small business specialists whose services are available to any business, large or small. These specialists are knowledgeable of procurement regulations as well as the procurement plans of the Defense Department. They seek to channel all interested representatives of business and industry to the appropriate buying center, or to a prime contractor if it appears that the enterprise in question is a logical contender for a subcontract.

Another group of about 2,400 people are involved in systems and financial management activities. The main concern of this group are such things as contract changes, shipping instructions, pre-award surveys, inspection and receiving reports, and many other documents essential to the expeditious prosecution of the business of military procurement. It is essential that these data move swiftly and accurately, and to accomplish this DCAS uses electronic means of data transmission whenever possible.

Soon to become a reality in DCAS operations are two programs designed to greatly speed up transmission of information. One of these is called MILSCAP (Military Standard Contract Administration Procedure). The other is a project called Mechanization of Contract Administration Procedures. When these two programs are fully implemented, most of DCAS activities will be conducted through a network of computers, and the delays occasioned by the present necessity of transmitting much data in hard copy form will be eliminated. Most data required by the contractor, the contract administrator, the buying office and the user will be forwarded to each automatically, and much more rapidly than at present.

Should the need for a special inquiry arise, the standardization of information and the compatibility of the data processing equipment will permit instantaneous response.

Many of the contracts DCAS administers deal with matters having a security classification. DCAS has been assigned the mission of maintaining appropriate security safeguards not only for contracts administered by DCAS, but for all contracts awarded by DOD, and for contracts awarded by other government agencies.

Approximately 900 DCAS people are engaged in the industrial security function. They inspect and issue security clearances for contractor facilities. They monitor contractor security programs and procedures. They evaluate the ability of contractors to safeguard classified information on a world-wide basis. They process approximately 400,000 requests per year for individual security clearances. The objective is to provide defense contractors with accurate and understandable guidance as to their security obligations so that effective protection of classified information is assured as economically as possible.

Another group of about 150 DCAS personnel is charged with responsibility for implementing the provisions of Presidential Executive Order 11246. The Executive Order requires that, in work performed under government contracts, there must be no discrimination on the basis of race, creed, color, or national origin, and that there must be affirmative action to produce equal opportunity of employment. This function, called Contract Compliance, was transferred to DCAS from the Office of the Assistant Secretary of Defense (Manpower) on July 1, 1967. The Contract Compliance group conducts Compliance Reviews, Follow-up Compliance Reviews, Pre-Award Compliance Reviews, and Investigations of Complaints of Discrimination. Approximately 50,000 Contract Compliance reports (SF–100) were received by the 11 DCAS regions during the last six months of 1967.

One might say that this merely implements national policy and, therefore, it should be a simple and straightforward matter. It does not always turn out that way. There is generally no basic disagreement as to the objectives. Most Americans subscribe to the desirability of fair recruitment and selection practices, fair promotion policies, and collective bargaining relationships. There is no disagreement that minority groups, the underprivileged, the handicapped and the disadvantaged must have an opportunity to become productive persons.

Where there is disagreement is in the selection of the means by which these objectives are to be reached. DCAS Contract Compliance personnel are specialists in their field. They have worked with employer associations, with union councils, minority group organizations, private and public employment agencies, and with interested segments of municipal, state and Federal Government. Based on this experience and other experience gained in working with many contractors, when these DCAS specialists conduct a compliance review or investigate a complaint, they are usually able to quickly identify problems and to make recommendations for their resolution. Despite the sensitivity of this responsibility, DCAS recognizes that it impacts upon the tranquility of our communities and the stability of our nation, and responsibility for this program is taken very seriously.

As DCAS has gained experience it has continuously found new ways to provide better administration of contracts at lower cost. In this search for better methods, enthusiastic support has been received from the Military Services, DOD, DSA, and from industry.

A standard pattern of delegation for contract administration, the policy for assignment of contracts for administration, was issued by the Assistant Secretary of Defense (Installations and Logistics) in February 1964. The initial policy was necessary to facilitate understanding between DCAS and the Military Departments. This pattern specified standard responsibilities when a contract is delegated to DCAS for administration. Additional responsibilities may

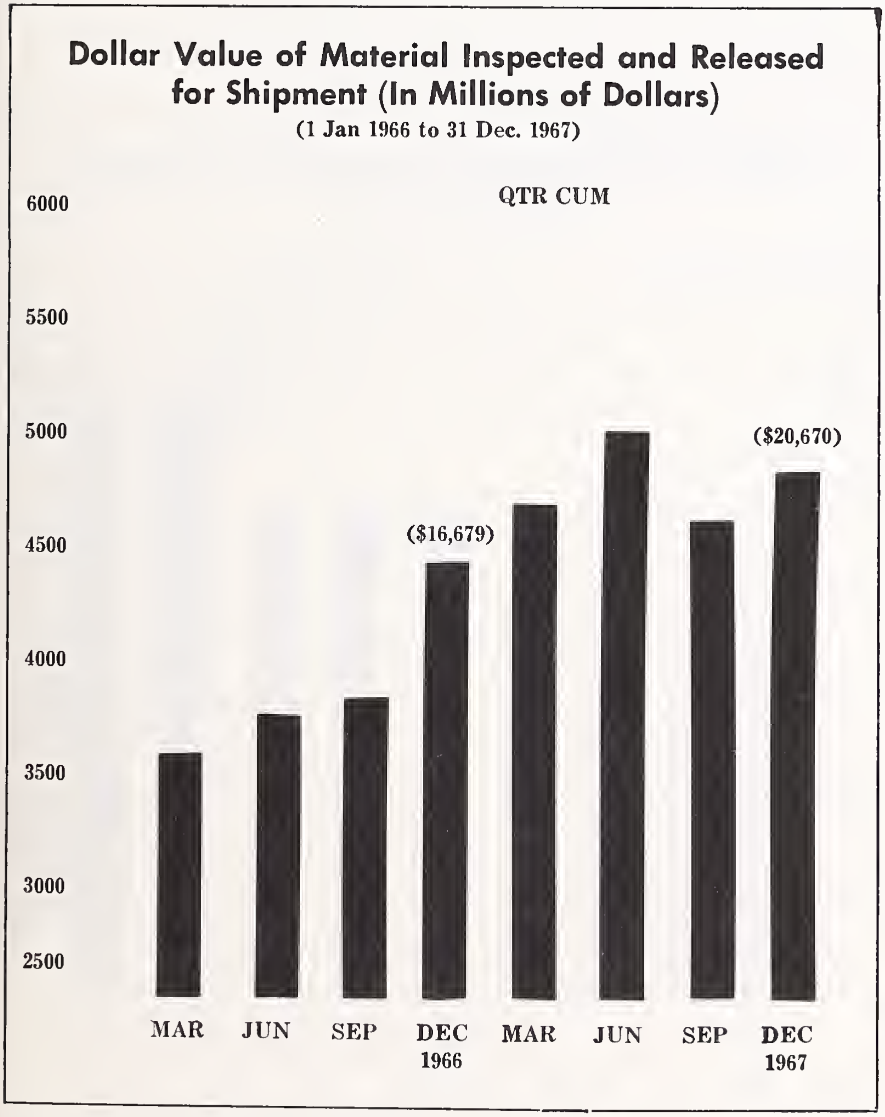
At Watts Manufacturing Co., Watts Los Angeles, government-industry trio review production flow plan for manufacture of hospital tents for Defense Personnel Support Center.

be added at the option of the procurement organization.

Changes in this pattern have been developed and accepted during the past two years. Examples of delegations assigned to DCAS include engineering support, safety surveillance of hazardous and dangerous materials, and the administration of medical supply contracts. Defense Procurement Circular (DPC) No. 58 clarifies and clearly delineates the contract administration services responsibilities to be performed by DOD contract administration offices. Further, DPC No. 58 is specific in defining the contract administration functions that are to be performed by contract administration offices, and defines the types of contracts which purchasing offices may retain for administration.

During 1967 the Armed Services Procurement Regulation (ASPR) Contract Administration Panel succeeded in having standard regulations published in numerous contract administration areas, such as inspection and acceptance, inspection and receiving reports, property administration and contract files. Standard procedures were also approved for contract terminations and property disposal. In process are cases developed by the panel in other areas, such as transportation, production surveillance, and reporting and utilization of industrial plant equipment.

The Corporate Administrative Contracting Officer (CACO) program was implemented in several DCAS regions during 1967. This program entails the assignment of an administrative contracting officer (ACO) to be cognizant of the contractor's corporate level organization. A single ACO, in a region, is assigned the responsibility for the review and approval of policies and procedures having impact upon subordinate contractor organizations.


Dollar Value of Material Inspected and Released for Shipment (In Millions of Dollars)

(1 Jan 1966 to 31 Dec. 1967)

The Contractor's Weighted Average Share in Cost Risk (CWAS) program was implemented by DCAS regions during 1967. The program encompasses:

- A technique for determining the contractor's assumption of cost risk for a given fiscal year through an analysis, by contract type, of costs incurred.
- The establishment of a threshold level for the relaxation of the requirement for determination of the reasonableness of certain overhead costs.

An automated reporting system monitors approximately 340 ammunition components for the use of the U.S. Army Munitions Command in scheduling ammunition loading plants, shipping facilities and transportation for munitions critically required in Southeast Asia.

A special emphasis program was initiated on selected contracts for government-furnished equipment in the Accelerated Strike Aircraft Program. By the end of 1967 detailed status reports were being furnished the Naval Air Systems Command monthly on approximately 195 contracts.

Special production monitoring continues to substantially reduce the number of DSA-managed items in critical stock positions.

The first three-volume publication of the Register of Planned Emergency Producers was distributed in April 1967. The register lists 13,000 facilities and/or plants indicating a willingness to produce critical items under emergency conditions. Listings are published alphabetically, geographically, and by Armed Services Procurement Planning Offices for primary distribution to the Military Departments and DSA.

During 1967 a standby plan, for use should hostilities in Southeast Asia cease, was completed and is available for immediate use by each DCAS region. It provides a readiness capability implementing an expanded termination for convenience program.

At the request of the Office of Assistant Secretary of Defense (Installations and Logistics), DCAS is developing an improved system for assuming an executive agency assignment for foreign government procurement support. The new system will provide for direct communication between the foreign embassies and DCAS, and shorten the flow time for the requests.

In late 1967, DCAS initiated a series of 11 seminars for instructing government property administrators in recent changes in Armed Services Procurement Regulation relative to improving management of government-owned industrial property used for defense contracts. The seminars are being held at each DCAS region location and are being conducted primarily to train the government property administration personnel. However, industry personnel are being afforded the opportunity to participate in this instruction (see item in January 1968 issue, *Defense Industry Bulletin*, page 15).

DCAS small business specialists participate in DOD small business training sessions. This training provides them with the technical competence needed to provide local, one-step counseling guidance to small business concerns on how to do business with the Army, Navy, Air Force and DSA. Recently DCAS published a small business brochure* for use as a counseling aid in assisting small business and labor surplus area concerns in obtaining information on subcontracting opportunities available to them. The DCAS Small Business Office actively participates in the President's Committee on Employment of the Handicapped in a program to utilize sheltered workshops (for handicapped persons) as potential sources for defense items. DCAS specialists make known the capabilities of the sheltered workshops to prime contractors who, in turn, often offer them subcontracting opportunities.

To reduce specification deficiencies in procurement data packages, which frequently cause contract administration problems, a program of specification reviews has been initiated and specific recommendations will be fed back to purchasing activities.

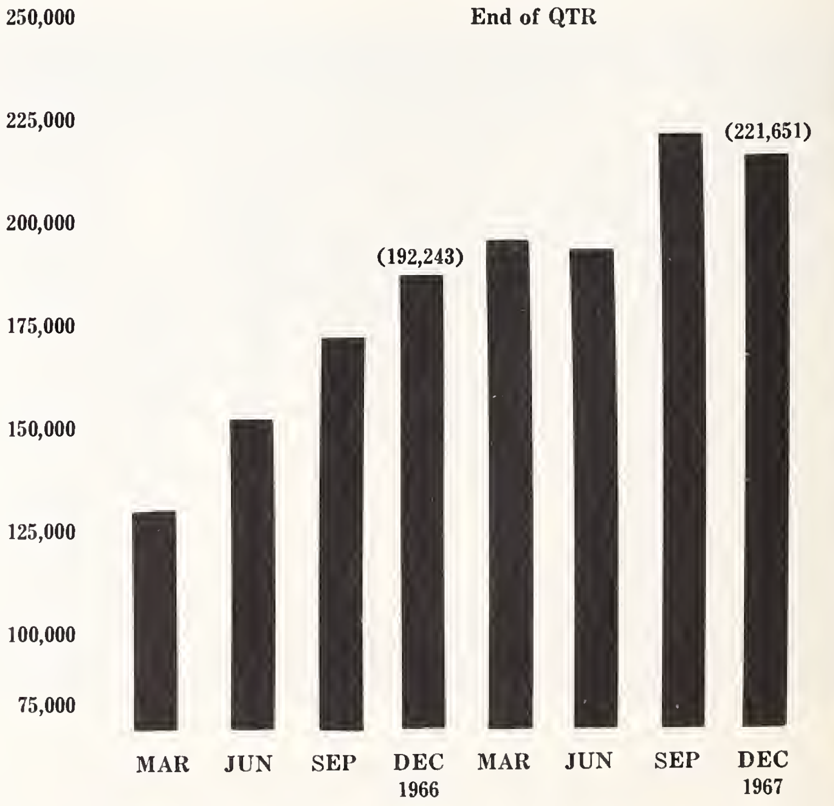
A quality audit program has been developed to provide an independent product evaluation by personnel other than the individuals directly responsible for inspection and acceptance. These quality audits provide additional assurance that the products received by using activities conform to quality requirements. Participation by buying agency personnel is encouraged.

Recognizing a continuous need for liaison between DCAS, the procuring activities and contractors, a formalized Customer Relations Visit Program has been established. The goals of this program are to improve the effectiveness of personal communications between DCAS and its customer organizations; to obtain customer's views concerning the quality, effectiveness, and efficiency of service rendered to them by the DCAS organization; and to identify those actions required for resolution of mutual problems or complaints. Over 40 buying agencies and users were visited during 1966 with an additional 30 customer relations visits conducted in 1967.

These and other efforts are all aimed at achieving the DCAS pledge of improved service on land, sea, air and certainly in Vietnam. For example, failure to provide complete support at some isolated location can present great difficulties. When a construction project is undertaken in Vietnam, every piece of equipment is essential. Very early in the game, DCAS developed a technique of coping with this problem. When a project in one of these

Number of Contracts Under Production Surveillance

(1 Jan 1966 to 31 Dec 1967)



**Free copies of the DCAS Small Business Brochure may be obtained by writing Defense Supply Agency, Code DCAS-A, Cameron Station, Alexandria, Va. 22314.*

isolated areas is identified, DCAS personnel follow production of every item required for the project as a package so that it can be delivered complete in every respect.

DCAS personnel are now inspecting materiel and releasing it for shipment at the rate of $1.7 billion a month. This includes ammunition and weapons at an annual rate of $2.4 billion; petroleum products, $1 billion; electrical and electronic equipment, $6.1 billion; missile, aircraft and space vehicle components, $2.2 billion; and textiles and clothing, $1.2 billion.

Vietnam has taught DCAS a great deal about new products and old products with a new look. For example, the familiar pierced steel airfield landing mat of World War II was not satisfactory. It quickly became apparent that in Vietnam there was a requirement for interlocking steel plank with greater strength. In addition, extreme dust and mud conditions in Southeast Asia made a solid surface desirable. Three new types are now in use, one of which is approved for medium duty jet use. There is also extensive use for hard stand, revetments and other applications requiring a solid, quickly installed, durable surface. Almost $150 million dollars worth of this new steel planking has been procured to date.

The soil, itself, has prompted use of two entirely new techniques. It has been observed that much of Vietnam is either dust or mud, depending upon the season. This situation has given rise to a requirement for large quantities of soil binder, an item for which there was little previous demand. It has been necessary to develop methods of packaging, transporting and storing large quantities.

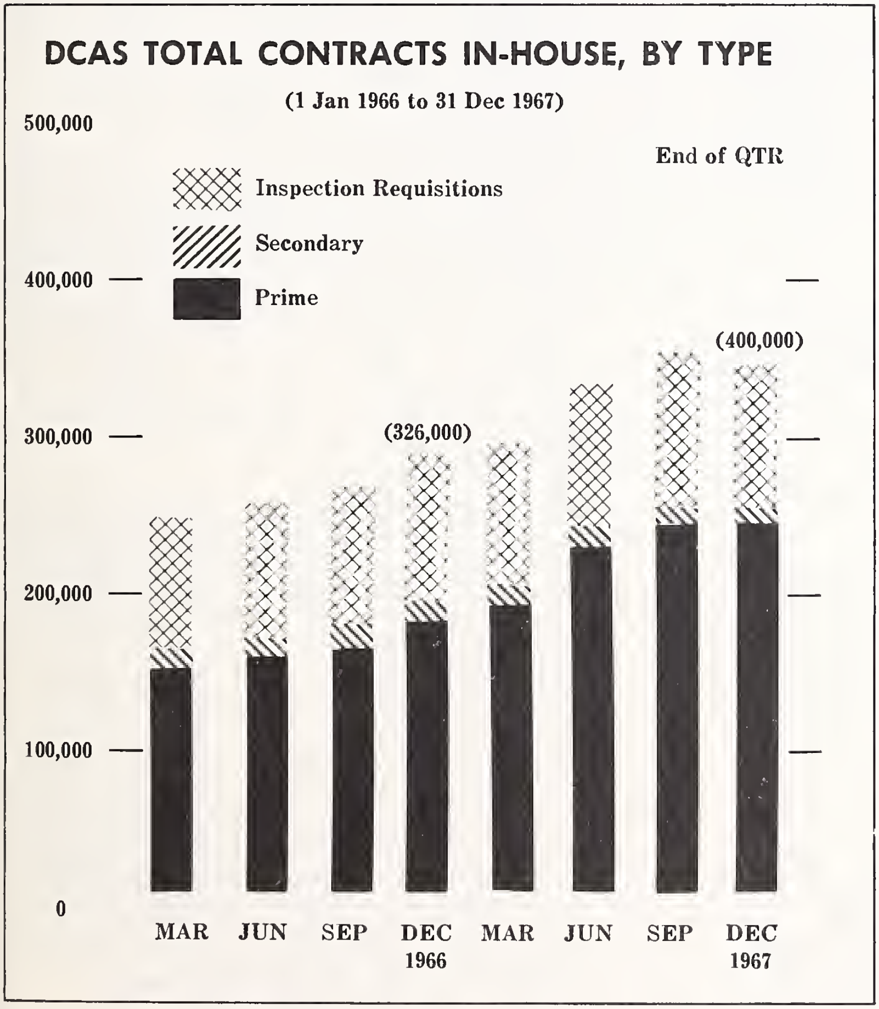
Another method of dealing with unstable terrain is the use of large areas of waterproof membrane which can be spread over the ground. This may well prove to be an important means of rapidly securing an area and operating within it.

As stated earlier, the volume of materiel being inspected is now well over $20 billion a year. However, the dollar volume tells only a small part of the story. DCAS has brought many new producers into the defense program. Even such things as uniforms, shoes and textiles, when they are destined for use in Vietnam, demand that the manufacturer be educated and made sensitive to the conditions under which they will be used. The same can be said for electronic components of all sorts. A component, which may perform admirably in a television set in a living room, may fall far short of the reliability required if it is destined for the climate and terrain of Southeast Asia, or for one of the space programs which DCAS is supporting.

DCAS is a young organization and has grown in a period of rapid buildup of procurement. In many areas, the DCAS workload increase has exceeded 100 percent in less than three years. At the same time, personnel strength has increased less than 20 percent. Yet the job is being done effectively.

Even more important is the flow of support that is reaching Vietnam. In the initial stages of any operation of this magnitude, one might reasonably expect serious shortages of material and serious problems with quality and reliability. The record is not perfect, but it is difficult to conceive that anyone would contend that logistic support of our military effort around the world has been other than ample and on time. This achievement could not have been attained without the cooperation and support DCAS has received from industry and from DOD and other government agencies.

Had he been a comtemporary, perhaps Rudyard Kipling would have added a few more stanzas to "Boots-infantry columns."


DCAS TOTAL CONTRACTS IN-HOUSE, BY TYPE

(1 Jan 1966 to 31 Dec 1967)

Defense Contract Administration Services Regions (DCASR)

DCASR, Atlanta
3100 Maple Drive NE
Atlanta, Ga. 30305
Phone: (404) 261–7310

Col. L. P. Murray, USAF
Commander

Provides contract administration services on a wide variety of products ranging from heavy electronics to clothing and textiles, munitions, missiles, aircraft and space components, chemical, petroleum and medical supplies.

DCASR, Boston
666 Summer St.
Boston, Mass. 02210
Phone: (617) 542–6000

Col. F. A. Bogart, USA
Commander

Products being administered include clothing, textiles, petroleum products, medical supplies, ammunition, weapons and weapon systems, jet engines, sonar and radar systems, infrared detection and spectroscopy, helicopters, optical equipment, and highly complex electronic systems for the Apollo, Poseidon, Saturn and LEM programs.

DCASR, Chicago
O'Hare International
Airport
P. O. Box 66475
Chicago, Ill. 60666
Phone: (312) 694–3031

Col. J. P. Gibbons, USAF
Commander

Has commodity responsibility in electronics, including communications equipment and radar sets; ammunition; clothing, such as uniforms, G-suits and armored vests; and mobility equipment ranging from forklift trucks and bridge launchers to tape-controlled plant machinery.

DCASR, Cleveland
1240 E. Ninth St.
Cleveland, Ohio 44199
Phone: (216) 522–5268

Col. N. T. Dennis, USA
Commander

The number of contracts administered by this region covers the complete spectrum represented by DOD procurement, *i.e.*, food to combat vehicles, clothing to jet engines and space hardware.

DSASR, Dallas
500 S. Ervay St.
Dallas, Tex. 75201
Phone: (214) RI 9–2375

Capt. W. G. Normile, USN
Commander

Within the overall DOD programs coming under the administrative responsibility of this region are such critical items as aircraft, bombs, bomb fins, textile and clothing, POL and electronics. Ammunition contracts administered include items ranging from anti-personnel bombs up through 500- to 750-pound bombs.

DCASR, Detroit
1580 E. Grand Blvd.
Detroit, Mich. 48211
Phone: (313) 923–0100

Col. K. Johnson, USA
Commander

The main area of commodity responsibility lies in the automotive field with the greatest number and dollar value of contracts for commercial and tactical vehicles, engines, tires and spare parts. One of the major weapon systems under administration is the new MBT–70 main battle tank, a joint effort of the United States and the Federal Republic of Germany. The DCAS office in Ottawa, Canada, acts as the DCAS "go-between" with the Canadian government on contract administration matters.

DCASR, Los Angeles
11099 S. La Cienega Blvd.
Los Angeles, Calif. 90045
Phone: (213) 643–1000

Brig. Gen. A. E. Exon,
USAF,
Commander

This region's major area of commodity responsibility concerns development and production of electronics equipment. It is deeply involved in the administration of the National Aeronautics and Space Administration's contracts held by the aerospace industry.

DCASR, New York
770 Broadway
New York, N. Y. 10003
Phone: (212) 677–3030

Brig. Gen. W. M. Vann,
USA,
Commander

The list of products under this region's surveillance is almost limitless. A partial listing would include radar, computers, communication and tracking systems, re-entry vehicles, nuclear components, wheeled vehicles, ammunition, propellants and explosives, nuclear ordnance, missiles and spacecraft, chemical products, medical supplies, petroleum, textiles, books and optics.

DCASR, Philadelphia
P. O. Box 7478
Philadelphia, Pa. 19101
Phone: (215) 271–4011

Col. G. Johnson, USA
Commander

This region administers approximately 35 percent of all fuse contracts procured for the Military Departments. Other major commodity responsibilities include a variety of all types of ammunition, arming devices, five types of personnel carriers, space suits for the Apollo program, and aircraft landing mats and landing devices.

DCASR, St. Louis
1136 Washington St.
St. Louis, Mo. 63101
Phone: (314) AM 8–6210

Capt. R. S. Sullivan, USN
Commander

The area covered by this region ranges as far west as Wyoming and as far north as Minnesota. Major commodity responsibilities are in the electro-mechanical, aircraft and ordnance support areas covering such items as jet aircraft, guided missiles and rocket launchers.

DCASR, San Francisco
866 Malcolm Rd.
Burlingame, Calif 94010
Phone: (415) 692–0300

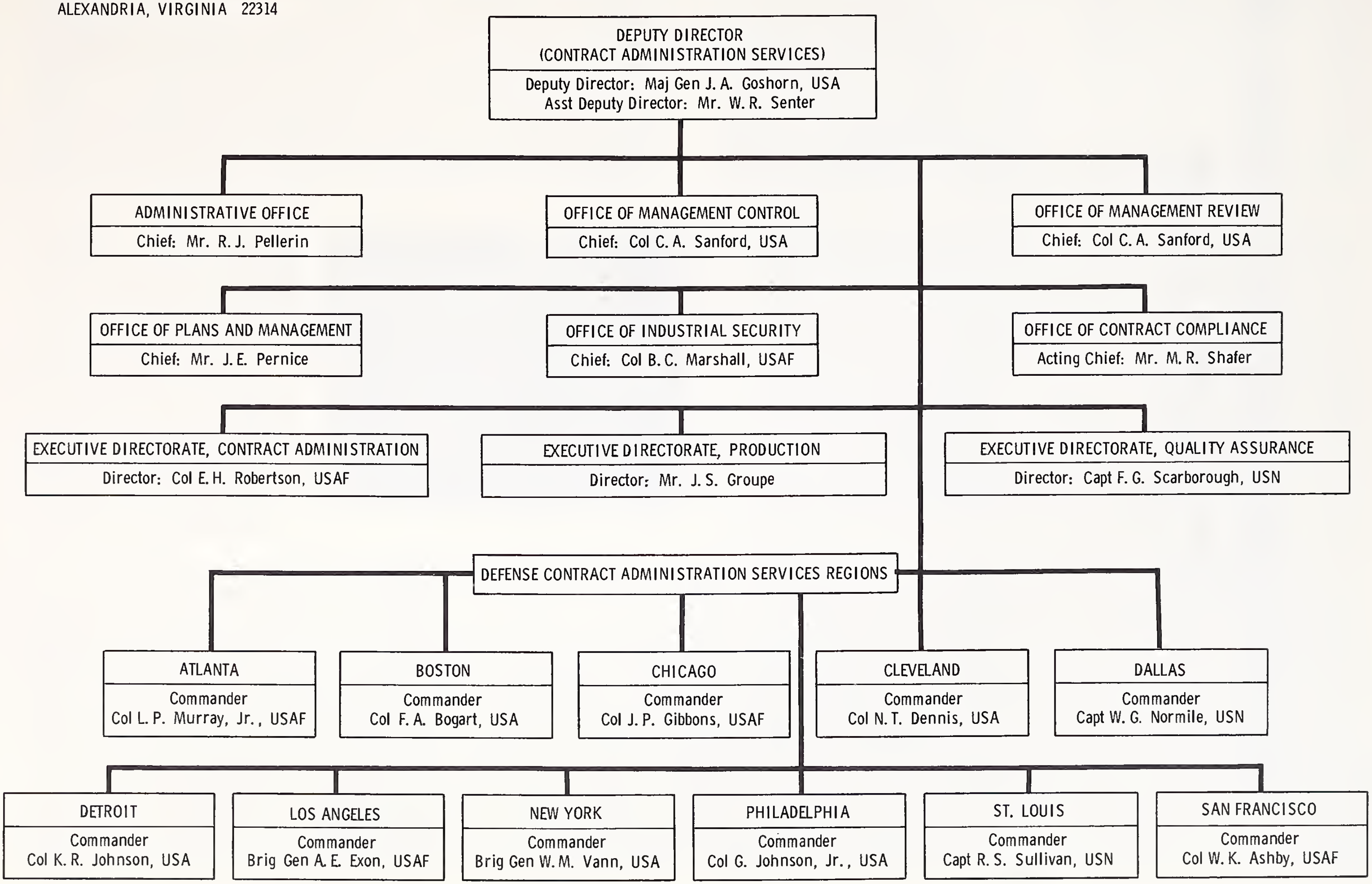
Col. K. Ashby, USAF
Commander

The geographic area covered by this region includes Alaska, Hawaii, the Mariana Islands, and the Marshall Islands. This region accepted the communications satellites to be placed in orbit to provide private communications channels for U. S. installations world-wide; accepted enough Armed Forces rations to load an 18-mile-long train; and accepted vast quantities of cement shipped from Hawaii.

DEFENSE SUPPLY AGENCY

DIRECTORY OF
DEFENSE CONTRACT ADMINISTRATION SERVICES

DEFENSE SUPPLY AGENCY HEADQUARTERS
CAMERON STATION,
ALEXANDRIA, VIRGINIA 22314



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Defense Communications Interface with Commercial Carriers

Renato Tramontano

The Defense Department annually invests about $1.5 billion for telecommunications equipment and spends about $360 million for commercially leased communications circuits, networks and equipment.

Telecommunication, as defined by international agreement, is: "Any transmission, emission, or reception of signs, signals, writing, images, and sounds of intelligence of any nature by wire, radio, visual, or other electromagnetic systems." Telecomunication includes:

- Telephone, telegraph, and data circuits and their associated processing, switching and terminating devices.
- Satellite communications.
- Radio, radar and navigational aids.
- Microwave, tropospheric scatter, cable, and landline systems.
- Electronic countermeasures equipment.
- Cryptologic and telemetry systems.
- Television and display facilities.

The DOD interface with commercial carriers for the management of leased communications is the Defense Commercial Communications Office (DECCO), at Scott AFB, Ill. DECCO, a field activity of the Defense Communications Agency (DCA), does the biggest commercial telecommunications management job in DOD. In FY 1967, DECCO paid bills totalling $250 million to communications carriers. Its operations are international in scope. In addition to managing leased services in the continental United States (CONUS), DECCO is responsible for DOD leased services in Hawaii and Canada, and for international circuits emanating from the United States and its possessions. DECCO leases circuits in transoceanic cables to Hawaii, Guam, the Republic of the Philippines, Japan, Europe and the Caribbean. DECCO is responsible for procuring satellite circuits, of which more than 40 are now serving DOD. Involved in the management and negotiation for the leased services are over 300 franchised communications carriers, Federal and State regulatory agencies, and approximately 25 customers (sub-commands of DOD) with varied defense missions.

An outstanding job of reducing the cost of leased private line service to the DOD is reflected in the DECCO validated cost reductions reported during the Initial Five-Year Cost Reduction Program ending in FY 1966 (Figure 1). Under the new DOD Cost Reduction and Management Improvement Program, DECCO's reportable cost savings for FY 1967 were $1,202,400. The DECCO goal for FY 1968 is $2,000,000.

DECCO

The DECCO story is one of effective management and good teamwork between DOD and the communications industry. It is the story of the successful application of management principles of consolidation, centralization, quantity procurement, and automation dedicated to improving telecommunications support to the Military Departments and Defense Agencies at the lowest feasible cost.

DECCO developed from the need for centralized management and procurement of leased communications services for DOD. In the late 1950s, command and control communications had become vast complexes attended by problems that demanded immediate solutions.

- The Cold War, with its nuclear counter strike forces, emphasized the need for information and control on a real-time basis.
- The U.S. Air Force conceived and developed the huge SAGE (Semi-Automatic Ground Environment) network, an intricate radar early warning, fighter, and missile control system guarding the North American frontier.

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- Complicated digital logistics communications networks also grew rapidly to support the various weapon systems.

The communications requirements for these sophisticated attack and defense weapon systems were a challenge to the ingenuity and productivity of the military users and the industrial producers. The biggest question was: "Where are we going to get the communications equipment and skills necessary to tie these widely dispersed operations to a single directing agency?"

For the answer, the Air Defense Command (ADC) turned to the telecommunications industry—to the common carriers who were providing leased communications services to the Military Departments. These carriers were prepared to develop the equipment and manpower skills; they already had much of the long-line requirements in place; and they did not have the Military Services' ever-present problem of skill retention. As part of the ADC's continuing effort to improve the management of communications leasing, an office was formed to act as a central agent for SAGE leasing transactions. This new office took three important steps that laid the groundwork for the eventual formation of DECCO.

- Communications cost analysts were employed to negotiate costs with the commercial carriers for the construction of SAGE facilities.
- Contracting, accounting and disbursing functions were automated.
- SAGE communications requirements were routed for maximum bulk rates under the Multiple Channel Tariff offered by the commercial carriers for interstate leased facility service. The Multiple Channel Tariff reduced the rates for all but the first three circuits of the same general type to the same customer between the same rate centers. As additional circuits were added, the percentage of rate reduction increased. The tariff applied to two general types of circuits—voice bandwidth and telegraph bandwidth—with separate applicability for each type and for each customer. For example, if ADC leased three voice and three telegraph circuits between Washington, D.C., and New York City, all circuits would be priced at normal rates. However, if a fourth voice circuit was added by ADC between the same two points, that circuit would be priced at about 10 percent less than each of the other voice circuits. The cost of the original circuits remained the same. Any additional circuits would be added at progressively reduced costs.

The success with which the ADC office reduced the cost of telecommunications for the SAGE program, and also the management overhead costs for both ADC and the commercial carriers, influenced ADC to centralize all its leased communications activities at Colorado Springs, Colo. This consolidation created a single leasing office large enough to exploit the Multiple Channel Tariff rates of the communications carriers.

In 1960 the ADC centralized leasing activity was placed under the jurisdiction of the Air Force Airways and Air Communications Service to become the nucleus of an Air Force-wide manager for long-lines communications leasing. The Air Force-wide leasing activity became known as the Office of Commercial Communications Management (OCCM) and, in late 1961, was moved to Scott AFB, Ill., as a staff element of the newly created Air Force Communications Service.

At this time each of the Military Departments had established a central point for leasing commercial services. Previously, as many as 25 military customers of the commercial carriers were separately leasing communications services, without considering the leased facilities of other Military Departments or commands.

A DOD study determined that there should be a central point for leasing private line circuits for all elements of DOD, and designated OCCM as the interim activity to perform the function. Centralized management of communications leasing assumed even greater significance with the introduction of the new TELPAK tariff by the major U.S. communications common carriers. By January 1962, integration of all the leased records of DOD activities had been completed. On Dec. 31, 1962, OCCM was redesignated as the Defense Commercial Communications Office (DECCO) and became an activity of the Defense Communications Agency. This reorganization established DECCO as the DOD commercial lease manager.

Initial Five-Year Cost Reduction Program

(DECCO Savings)

FY 1962	$ 7,500,000
FY 1963	15,889,726
FY 1964	58,200,000
FY 1965	89,400,000
FY 1966	114,800,000

Figure 1.

TELPAK Schedules

Schedule	Voice Circuit Capacity	Cost Per Mile Per Month
*A	12	$15.00
*B	24	20.00
C	60	25.00
D	240	45.00

* Effective Aug. 1, 1967,
Intrastate Offering Only

Figure 2.

TELPAK

TELPAK is the trade term for a "telecommunications package deal." It is not a physical package, pipeline, or conduit. It is a pricing arrangement for the routing of groups of circuits. The average circuit in such an arrangement travels through 10 TELPAKs between its origin and its termination. For example, between Washington and New York, DECCO could lease 20 different TELPAKs with AT&T for Bell System north/south circuits along the East Coast. Figure 2 shows typical costs of these TELEPAKs.

Schedule A TELPAK, the smallest offered, contains up to 12 voice-grade circuits. For the same cost, the user can replace the voice circuits with 144 teletype circuits, or 72 Class D data circuits, or 48 Schedule 3A data circuits, or 1 wideband service, or any combination of circuits which equal 12 voice grade channels or less. Schedule B and C TELPAKs have a capacity for 24 and 60 voice circuits, respectively. Schedule D provides the most economical pricing and the greatest savings on a per-mile basis. Schedule D, the largest TELPAK offered, provides up to 240 voice circuits, or 2,880 teletype circuits, or a combination of voice, teletype, data, video, and wideband circuits. The major part of the DECCO network is made up of D TELEPAKs.

Whenever possible, every circuit ordered in the United States by DECCO from commercial carriers is routed in TELPAK. Often a circuit must be priced partly in TELPAK and partly on an individual type basis, commonly referred to as Interexchange Service (IXC). In the event a circuit cannot be accomodated with full TELPAK application upon installation, DECCO has the IXC mileage flagged in its computer. The mileage is reviewed each month to see if further TELPAK applications are possible. DECCO has applied TELPAK to approximately 87 percent of the CONUS circuits.

Centralized Procurement

The TELPAK tariff specifies that only one agency will issue the contracting order for a TELPAK to the commercial carrier. However, the tariff permits more than one U.S. Government agency to participate on a shared basis.

Other Federal Government agencies have observed with increasing interest DECCO's success in reducing DOD's cost for leased commercial communications. Late in 1962, the Bureau of the Budget (BOB), the Defense Department, and the General Services Administration (GSA) agreed that DECCO would lease private line circuits for the Federal Aviation Administration (FAA). During the first year of operation, FAA reported savings of about $2 million.

Shortly thereafter, GSA arranged to share TELPAKs whenever it is to the advantage of both DOD and other government agencies to do so. The carrier simply splits the billing between the two agencies according to a designated percentage. Figure 3 shows GSA's participation in TELPAK procurement is already running into millions of dollars. Figure 4 reflects the savings earned through bulk procurement. The activation and expansion of many of the DOD communications systems, such as AUTOVON (Automatic Voice Network) and AUTODIN (Automatic Digital Nework), have more than quadrupled the TELPAK circuit mileage since 1963, while the monthly cost has only slightly more than doubled.

Improved Management

Centralization has led to greater cooperation and understanding between DECCO and the communications industry. DECCO has initiated administrative practices and procedures that have resulted in savings for industry and which have, in part, been reverted to the Government in the form of reduced rates or cost savings.

DECCO today is computer-oriented. Processing a customer's request for

GSA Participation in Joint TELPAKs

	TELPAK Route Miles Allocated	Monthly Cost
July 1963	1,060,170	$ 244,776.36
January 1964	1,101,119	340,759.00
January 1965	3,419,801	813,767.00
January 1967	6,168,475	1,324,693.75
July 31, 1967	6,421,265	1,385,482.23

Figure 3.

DECCO Participation in Joint TELPAKs

	Miles Voice & Telegraph	Monthly Cost
January 1963	3,227,790	$1,372,385.00
January 1965	8,843,494	2,245,089.00
January 1967	12,782,061	2,873,703.59
July 31, 1967	13,130,846	2,872,311.55

Figure 4.

a service or for a change in service has been reduced to a simple Inquiry/Quote/Order cycle. The inquiry is DECCO's request for bids; the quote is industry's response; and the order is the contracting action. Behind this cycle are the basic agreements with the carriers. A customer's requirement is procured by the issuance of a Communications Service Authorization (CSA) against a Basic Agreement which had previously been negotiated with the carrier providing the service. Financial data are established automatically by the computer using the inservice dates of CSAs printed by the computer.

Currently, 260,000 records are maintained in the computer's financial master file. Validation of bills, also a computer operation, has had a definite bearing on cost reduction. In the past, at least 30 days would elapse between the time a bill was received and the date it was paid. Automation has reduced the processing time to two days. DECCO administers over 55,000 accounts for which separate bills are received each month. Almost 25,000 of these bills are submitted on punchcards. When the information on these cards matches the account payable information on file in the computer, payment is authorized automatically. Ninety-eight percent of such bills received by DECCO are paid automatically.

The advantage to industry of rapid payment is obvious. Less obvious, but even more important to the Government, are the savings that accrue as a result of prompt payment. Vital working capital is quickly returned to industry whose overhead costs are thereby reduced. Since the Federal Communications Commission (FCC) governs the industry's profit, such cost reduction is returned in part through rate reductions.

Specialization has also permitted DECCO to provide pertinent data and testimony to support the government's position in the rate reduction hearings before the FCC. DECCO negotiates directly with the carriers for rate reductions, or initiates action through DCA for investigation by the FCC and state regulatory bodies. Substantial cost savings have resulted from such actions.

DECCO's growth, including its new operation in Hawaii, has not been accompanied by a corresponding increase in manpower and support costs. Instead, the number of operating personnel has actually decreased from a high of 298 to the present 268, and during FY 1967 a reduction of $35,000 in overtime costs was effected.

DECCO—Pacific

Centralized management of commercial communications leasing was introduced to the Pacific area with the lease of the AUTOVON switch in Hawaii, and the subsequent establishment of the DECCO-Pacific office in October 1966. Since its activation, DECCO-Pacific has reported $300,000 in cost reduction. The cost reductions are attributable to automation, reduced manpower requirements, and consolidated procurement.

During 1968, the government-owned, on-island trunking network in Hawaii will be transferred to the local communications carrier and the Government will lease needed services as required through DECCO-Pacific. Substantial reductions in manpower and operating funds, as well as improved service, may be expected from this action. A cost comparison study is being conducted to determine the cost effictiveness of transferring government-owned base, camp, and station private branch exchanges and other telephone facilities in Hawaii to the commercial carrier for operation and maintenance.

DECCO's Goals

DECCO has met the challenges of rapidly expanding technology, and has effectively applied central management of communications leasing to provide impressive cost savings.

Looking to the future one can see at least two vital areas for further economic gains: new or improved methods of leasing communications services, and ever-increasing applications of computers and other automation devices to telecommunications services. Improving communications leasing operations and reducing costs are continuing DECCO goals.

Sentinel Defense System Materiel Support Command Created

The U.S. Army is establishing a materiel support command as part of the organization for deployment of the Sentinel missile system, a Communist China-oriented defense against intercontinental ballistic missiles.

Headed by Brigadier General Mahlon E. Gates, the Sentinel Materiel Support Command will be one of the major subordinate commands of the U.S. Army Materiel Command.

The broad mission of the new command is to provide logistical support to the tactical equipment comprising the Sentinel system. This mission will involve providing repair parts support, depot-level maintenance, and national maintenance point services to the Sentinel system sites, including rapid movement of parts to these sites.

Temporary headquarters for the command are located in the Nassif Building in Bailey's Crossroads, Va., four miles from the Pentagon.

OCD Offers One-Week Course to Industry

A series of one-week courses in Industrial Civil Defense Management is being offered by the Office of Civil Defense Staff College in Battle Creek, Mich.

The course, which has no tuition fee, is open to all business and industrial executives who have responsibility for civil defense planning in industrial plants, institutions, and other large buildings and facilities.

Instruction consists of information and technical guidance in preparing for business, commerce and industry survival, and continuity of production in the event of an enemy attack or major natural disaster.

The next course will convene Aug. 26, 1968. Other courses are scheduled for No. 18-22; Feb. 3-7, 1969 and June 16-20, 1969.

For information and enrollment forms, contact local or state Civil Defense Directors, or write to the Assistant Director of Civil Defense, Industrial Participation, Office of Civil Defense, Department of the Army, Pentagon, Washington, D.C. 20310.

Equal Employment Opportunity Extends to Religion

Honorable Alfred B. Fitt

Executive Order 11246, issued by President Johnson in 1965, requires that all persons doing business with the Government provide equal opportunities in employment and personnel practices without regard to "race, creed, color and national origin." It further requires that contractors take *affirmative action* to comply.

Secretary of Labor W. Willard Wirtz has overall responsibility for carrying out this order, but everyone should understand that it clearly applies to all contracts with the Defense Department.

Last November Secretary Wirtz issued a memorandum, "Obligations Involving Religion," to all equal employment opportunity agencies in the Government, including the Department of Defense. The text reads, in part:

> Contracting agencies are reminded that the nondescrimination and affirmative action provisions of Executive Order 11246 apply equally to problems of employment concerning *creed* as to those concerning race, color, and national origin. Although Government contractors have made progress in affording employment opportunities without regard to religion, there remain industries and companies in which some religious groups, notably Jews, and to some extent Catholics, are still excluded from positions at certain levels of responsibility. Where this appears to be the case, Government contractors are expected to identify the problems and institute appropriate affirmative actions to obtain results.
>
> Agency compliance programs should provide the specialized coverage necessary to ensure that these requirements are being met.

There are several reasons why religious discrimination in American industry received little attention until recently. One reason is a relative lack of data on the subject. (The Equal Employment Opportunity report form now in use, for example, does not request data on religion, as it does on race, color and national origin.) Another reason is that such discrimination is certainly a less acute social problem than racial bias, and usually occurs, if at all, in upper management echelons.

Nevertheless, there is clear evidence that members of some religious groups are significantly under-represented in the executive suites of many large American corporations, with no apparent explanation except religious bias. Most of the available data and research in this area deal with discrimination against Jews, but many of the findings are applicable to other religious or ethnic minorities.

Alfred B. Fitt is Asst. Secretary of Defense (Manpower and Reserve Affairs). A native of Highland Park, Ill., Mr. Fitt received his B.A. degree from Yale University in 1946 and was graduated from the University of Michigan Law School in 1948. He is a member of the State Bar of Michigan, Detroit Bar Association, American Judicature Society and Federal Bar Association.

Large businesses generally recruit junior executives at undergraduate colleges, often preferring graduates of Ivy League colleges. Jews account for about 8 percent of college graduates up to the age of 50 in the United States, for about 15 percent of Ivy League graduates, and approximately 25 percent of Ivy League graduates in the past 6 or 7 years. Yet, research analyses of management personnel in major corporations and industries, published by the American Jewish Committee over the past 10 years, have consistently shown a representation of Jews under 1 percent. A University of Michigan study noted:

> . . . every serious effort to collect data on this subject has yielded the same general conclusions. In recent years, for example, Jews have comprised 12 to 15 percent of the graduating classes of the Harvard Graduate School of Business Administration, an institution to which the executive recruiters of many large companies regularly turn. Among the executives of such companies appearing at Harvard's seminars and training programs for businessmen, fewer than 0.5 percent were estimated to be Jewish.

Obviously it is wasteful to permit factors other than ability to influence hiring and promotion decisions, especially when there are shortages of executives in all segments of American industry.

Research investigations into the extent, nature and causes of employment discrimination against Jews in management have been conducted by the Graduate School of Business Administration at Harvard, by Cornell University, and by the Survey Research Center of the University of Michigan.

Harvard explored the techniques for recruiting executive trainees on college campuses, and how they often serve, deliberately or otherwise, to screen out members of minority groups.

The findings, reported in an article entitled, "The Ethnics of Executive Selection," by Lewis B. Ward, Professor of Business Research, Harvard Business School, in the *Harvard Business Review*, indicated that corporate officials are often unaware that some of their personnel men and recruiters tend to reject "anyone perceived as clearly different . . ." ". . . no one concerned really recognizes that discrimination is likely to be the outcome," Dr. Ward explained. "What appears to be needed is a change in values, not [simply] an order . . . to stop being prejudiced."

Dr. Ward's response to a claim by the personnel chief of a major manufacturer that few Jews apply for junior management jobs was:

> **Part of this can probably be explained by the grapevine; part from the fact that smart young men take a look at what has happened to other young men like themselves. If there are no Jews in management in the Carter Corporation [a fictitious name], a Jewish student isn't likely to waste much time in applying for a job there; it doesn't look like a promising place for a management career for him.**
>
> **Hence if the Carter companies of business wish to change the pattern of their management recruiting to include Jewish trainees, they will have to take active steps, not only to bring their companies to the attention of this group, but also to present to them convincing evidence that barriers to promotion do not exist.**

The Carter Corp., actually a major defense contractor, has made serious efforts to change the situation over the past three years, and has become one of the nation's bellwether companies in non-discriminatory executive hiring practices.

The effect of religion on career choice was the subject of a related study at Cornell University. Answers to questionnaires, distributed to 30,000 male students in 135 American universities, demolished the myth that Jews do not like to work for large corporations and prefer independent enterprises or professions—an assumption about "typical Jewish" attitudes which has served as rationalization for executive suite discrimination for many years.

The Cornell study found that superior students of all faiths prefer medicine and law to business; that most of the young men who prefer business, whatever their faith, want to work in large corporations; and the "Jews and Christians probably resemble each other more in their approaches to business than in many other respects."

During the 1930s an influential and broadly applied theory of corporate management held that religious compatibility and acceptability were important for the selection of executives or junior executives.

The Survey Research Center of the University of Michigan investigated the criteria other than ability or merit—social background, graduation from a prestige college, religion—that were used today in selecting and promoting executives within a typical large corporation.

The findings showed that many executives of large businesses tend to hire and promote people with social and religious background similar to their own, and believe that emphasis on "compatibility" or "acceptability" is vital for supervisor or customer approval. One major company, for example, cited as one criterion for management employment: "Does he look like us?"

Many business leaders have recognized the need to take measures to eliminate religious discrimination from the executive suite, and many defense contractors, especially, have carried out highly effective "affirmative action" programs toward this end.

Affirmative action for equal employment opportunity means simply that a contractor with the Government must take concrete measures to employ minority-group personnel. In practice, it means that management applies the standard operating procedures for success, the same techniques and controls it would apply to any necessary and important program. This includes an analysis of personnel practices to make certain that employees are judged only by their merit, and that no discriminatory criteria creep into the selection or promotion processes. Where there are discrepancies between policy and practice, the Executive Order requires that the contractor take corrective measures.

Standards of affirmative action apply to all types of discrimination—whether based on race, creed, color, or national origin—at all levels of employment. Since religious discrimination occurs mainly at management levels, affirmative action calls for measures somewhat different from those projected in compliance reviews for the current Defense Department contracts. Since the Standard Form 100 for equal employment opportunity does not cover religion, it may be helpful to outline some of the steps that may be taken by employers to meet the "Obligations Involving Religion" in the Labor Secretary's memorandum:

- Include colleges with substantial numbers of students of minority religious groups in recruitment schedules.
- Inform leaders of campus religious organizations about the company's non-discrimination policy.
- To help establish the non-discrimination image, involve company personnel of religious and ethnic minorities in interviewing and other recruiting activities.
- Request referrals of qualified people from religious and ethnic community and service organizations. Specialists in other companies may want, and be qualified for, policy jobs they cannot get in their own firms.
- Advertise job vacancies in publications directed to the religious and ethnic community. Send them press releases on promotions of employees.
- Review personnel records of current technical or specialized personnel. Their knowledge is often indispensable to policy making.

(Continued on Page 20)

Holloman AFB Unit Tests Navigation and Guidance Equipment

Lieutenant Colonel Leonard R. Sugarman, USAF

The U. S. Air Force's Central Inertial Guidance Test Facility (CIGTF) at Holloman AFB, N.M., adjacent to White Sands Missile Range, is a universally recognized government test complex. Officially designated the Directorate of Guidance Test, Air Force Missile Development Center, CIGTF was conceived in the Air Research and Development Command era, nurtured and matured in the Air Force Systems Command environment, and given Defense Department recognition in the schema of the Director of Defense Research and Engineering.

The CIGTF was established to provide an in-house Air Force capability to test and evaluate products of the inertial navigation and guidance industry. Specific mission goals are:

- Unbiased evaluation of components and systems to provide data from which the using agency can select the optimum equipment for a given mission application.
- Development of a single centralized test facility to avoid the prohibitive costs of duplication.
- Standardization of tests to provide common yardsticks for comparative evaluation.
- Competence in both personnel and equipment to insure meaningful reports.

Historically, CIGTF grew and attained recognition by testing boost-phase guidance systems for Titan and Minuteman ballistic missiles and Centaur and Saturn space payload launchers. These tests made use of the Holloman seven-mile long, high-speed test track. However, in 1964 test emphasis shifted to the evaluation of aircraft inertial navigators. The test methods and techniques for analytical evaluation, rigorously developed during the missile and space booster era, were applied to the validation of aircraft systems. This growing competence resulted in increased emphasis on the CIGTF role as a natural focal point for navigation system testing. The use of the test facility by the three Military Services, the National Aeronautics and Space Administration, Federal Aviation Agency and private industry illustrates national recognition of its expertise in this area of testing with commercial as well as military applications. CIGTF programs, progress and future plans are as dynamic as the impact of their test efforts on weapon system development, procurement and production has been dramatic.

Current tests of national significance within the Gyroscope Test Branch consist of components for the Short Range Attack Missile (SRAM), C–5A, Centaur and Self-Aligning Boost Re-Entry Systems (SABRES). In the Accelerometer Test Branch are also components for SRAM and Centaur, as well as Minuteman. Recently completing tests at the test track directorate were the Honeywell Strapdown Inertial Guidance Navigator I System (SIGN I), United Aircraft Apollo/Lunar Excursion Module Abort Sensor Assembly, Teledyne's Flight Reference Stabilization System, and Ford Instrument Co's Settable Inertial Altitude Sensor, the latter sponsored by the U.S. Army Picatinny Arsenal. Re-certification of the Minuteman NS–10 platform continues for the Air Force Logistics Command. Soon to arrive for a series of sled runs is the Marshall Space Flight Center's Advanced Saturn Single Axis Platform system. These test activities are performed with a staff of 260 government employees with almost 100 professional engineers—divided equally between the military and civil servants.

Lt. Col. Leonard R. Sugerman, USAF, is Executive Officer, Directorate of Guidance Test, Air Force Missile Development Center, Holloman AFB, N.M. He holds an engineering degree from the Massachusetts Institute of Technology and a masters degree in business administration (research & development) from the University of Chicago.

These current programs at CIGTF illustrate the two major test areas—the testing of missile guidance systems and the testing of aircraft inertial navigation systems, as well as components for these systems. As previously mentioned, the emphasis shifted in 1964 to the evaluation of aircraft inertial navigators. Along with this action, CIGTF gained DOD recognition in 1965 as the focal point for evaluation of navigators. Secretary of the Air Force Harold Brown, then Director of Defense Research and Engineering, augmented the directorate's charter in aircraft inertial navigation system validation by memorandum to the three Service Secretaries for Research and Development. Dr. John Foster, the present Director of Defense Research and Engineering, has reaffirmed that 1965 decision.

The significance of these directives becomes apparent when a comparison is made between the old and new procedures in evaluating different systems. An example is the inertial navigator for the F–111 Mark II Avionics System. Thirteen competitive systems were identified in response to the Request for Proposal from Air Force Systems Command's Aeronautical Systems Division (ASD). Previously, under the old procedure, the Air Force would have selected one of the 13 systems based on limited tests and contractor brochure data. Under the new procedure, 8 of the 13 were eliminated because they were not delivered to Holloman by the specified delivery date; and only 2 of the 5 were able to make it to the test completion date. This highly selective procedure results in minimum time in evaluating and accepting the desired system.

Tests on guidance and inertial navigation systems are conducted in four locations: in the laboratory, on the 35,588-foot test track, in a specially equipped portable van, and in aircraft (both cargo and fighter types).

Laboratory testing complements the other test methods, such as sled, aircraft and van. The tests range from humidity to acceleration. The outstanding feature of the laboratory program is the ability to automatically control, program and record data from repeated test conditions. Mainly the laboratory tests concern the inertial components. The evaluation of inertial quality gyroscopes and accelerometers is the function of the Laboratory Test Division of CIGTF.

The major test equipment to evaluate a gyroscope include nine single-axis servo/rate turntables for the testing of rate-integrating gyroscopes; two tables having two-axis servo test capabilities for the testing of "free-roter" type gyroscopes; and a two-axis gyrocompassing test fixture used primarily for gyrocompass tests. Also included is the required electronic and data recording equipment.

The standard accelerometer test equipment includes a Leitz optical indexing head, a Goerz automatic indexing stand, and two 100-inch centrifuges. The tests performed include a 12-point linearity test, stability, repeatability, threshold and resolution, as well as centrifuge.

An Air Force technician of the Central Inertial Guidance Test Facility calibrates his recording equipment in the test van prior to a road test of the AC Electronics Advanced Manned Strategic Aircraft navigation system.

Provided a system passes all these tests, the inertial instrument may be sent to the environmental facilities for pressure-altitude, temperature, humidity, vibration, acceleration, and shock tests. The end aim, of course, is to insure a quality product once it completes a test cycle.

Track testing of guidance systems has long been in use at Holloman. The track could not be matched for producing abrupt changes and transient discontinuities in acceleration. The sled acceleration combined with a realistic (even though hard-to-control) vibration environment simulates the first few seconds of ballistic missile thrust. Therefore, the sled test environment is well suited for an overall shakedown of the complete guidance system (or components). The tests reveal any possible mismated components, *e.g.*, the aerospace ground equipment and telemetry, as well as expose malfunctions in any of the parts of the inertial measurement unit.

The sled test program normally contains three distinct phases. First comes the preparatory phase to determine the proper environment. The system/component has different vibration specifications, and this phase insures that the track environment is tailored to match them. It is usually accomplished with dummy masses in place of the actual test item. The number of test runs in this phase depends upon many factors and ranges from one to six.

Phase two consists of five to eight test runs which provide a functional check of the system in the operational environment, *i.e.*, sled environment. This portion of the program either validates the system or reveals necessary design modifications.

The final phase usually takes from five to seven runs. It consists of a detailed quantitative analysis of system performance. Between each of the phases, prior to the first sled run as well as after each run, the system undergoes many other tests in the laboratory.

A unique method of testing inertial navigation systems is the use of a specially equipped portable van. Although van testing cannot replace sled or flight testing, it does offer an inexpensive method of supplementing these types of tests. Surveyed check points are available at discrete intervals along the van route for use in evaluation of system accuracy as the van passes by, and for use as system position updates, if required. A transfer-alignment/maneuvering area is available at the Alkali Flat area southwest of Holloman. Using the bench marks as reference points, various routes are driven at different speeds to investigate the effect of variation of path-dependent parameters, such as profile, velocity, and g-level on the mechanization of techniques. Data acquired from this type of testing is used as a guide in specifying maneuvering required during flight.

The reason why CIGTF now conducts and highly recommends road testing, in a moving van, dates back to a simplified van test series consisting of five 30-minute runs conducted between July 23 and Aug. 3, 1965. The entire effort was accomplished with one engineer working about half-time and two technicians working full-time. The effort was directed primarily towards establishing hardware and operational requirements for using van testing as a complementary tool, to support guidance and control sled test programs. In addition to establishing hardware and operational requirements, sufficient information was obtained to assure that van testing of inertial navigation systems was not only feasible, but economical as well.

A test program using the van technique is one in support of Advanced Manned Strategic Aircraft (AMSA). It has extremely interesting and far-reaching implications. Technically an advanced development program, the results of Holloman testing will determine whether or not it attains full fledged weapon system status. Three contractors competed in van tests, designed to establish feasibility of alignment transfer schemes and position fix updating using Kalman statistical filtering techniques.

The first contractor to traverse the 134-mile, precisely surveyed desert route was Autonetics, using its N–16 as the Master Aircraft Navigator and its N–5 as the slave missile guidance system. The AKURON Velocity Matching Scheme (Kalman Filter), which is also programmed in the F–111 navigation system, was verified by the AMSA digital computer. Next to run the course was AC Electronics using an ASN–47/Carousel II combination. Finally, General Precision installed its gyro-monitor technique. Thus van testing has proven to be a very precise and relatively inexpensive way to check instrumentation and equipment operation, prior to the more costly flight tests which must compete for prime radar tracking time on the range.

Indicative of the information to be gained are:

- Ability or inability of the flight computer to update gyro bias terms for the proper latitude and longitude.
- System output position errors for long operating times.
- Total platform drift across a simulated mission of long duration.
- Resolution of operational and reliability problems prior to sled or flight test.
- Proof test of signal conditioning, instrumentation, and data handling equipment common to follow-on tests.
- Suitable data collection for checking out special ground computer software programs required for sled and aircraft data analysis.
- Means of transporting the system between track or flight line and laboratory without a system shutdown. This permits pre- and post-run calibrations to determine parameter shifts across a sled run without introducing transient effects due to shutdown.

It can be stated without reservation that the cost per van test is negligible compared to a sled or flight test.

The AMSA multiple source development approach ideally lent itself to van testing prior to C–141 tests. The goal was to demonstrate accurate transfer alignment (attitude transfer) and preflight techniques for rapid platform erection. Toward this end, the van test program was designed to:

- Determine functional integrity of contractor-provided equipments (Autonetics, AC Electronics and General Precision) and instrumentation in a relatively benign moving environment.
- Exercise each contractor's precision navigation and transfer alignment technique, and optimize these techniques based on system performance.
- Recommend systems which are qualified for follow-on flight testing, based on evaluation of the validity of techniques observed during road tests, *i.e.*, based on observed performance and potential.

The van test program scope could not be defined in terms of a specific number of test runs. Instead, the pacing factor, in determining the end point of the test program, was the date upon which systems were to be available at Wright-Patterson AFB for integration into the C–141 for subsequent flight test. It should be stressed that qualification flight test was contingent upon having demonstrated, from the Air Force point of view, a satisfactory potential based on in-van performance.

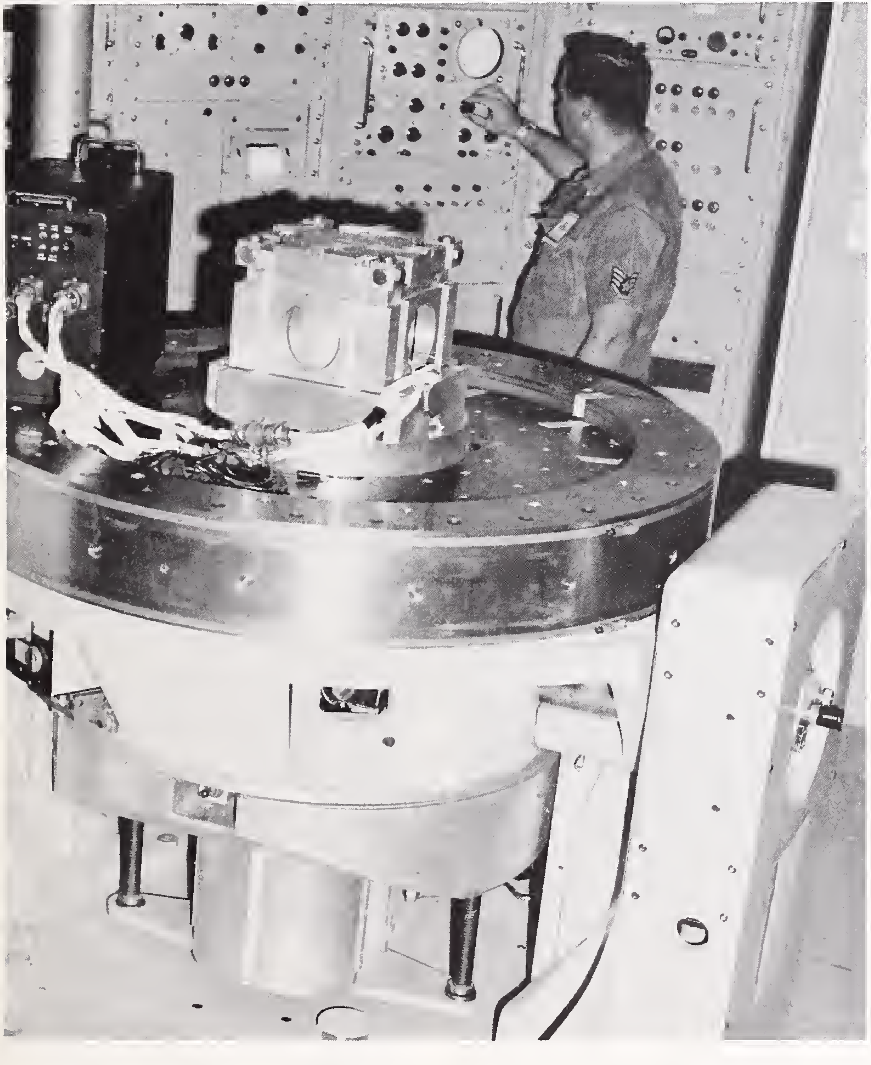
In the air, there has been much advancement made in the testing of inertial navigation systems. Early tests consisted of single sortie, high altitude, closed loop check flights using prominent land marks, such as church steeples, TacAN stations and road intersections, as check points that characteristically, but erroneously, enhanced system performance. Today there are in being cooperative tracking radar nets at Fort Huachuca, Ariz., Edwards and Vandenberg Air Force Bases which enable unbroken coverage over the entire southwestern United States. Position accuracy data is derived by continuously comparing White Sands Missile Range FPS–16 radar tracking information (better than 100 foot accuracy) to outputs of the on-board inertial navigator being tested. All data is recorded on tape using the same IRIG-B time standard to enable comparative evaluation.

In all locations where tests on guidance and inertial systems are conducted—laboratory, test track, van, or in flight—overall test results determine system performance numbers and the reliability and maintainability of the system/components.

Customers, who bring in their products for testing, desire one of two services. Either they want their product validated, or they desire a program to be established to develop it. These two categories of test—validation and development—have a mandatory and an optional phase. The Litton LN–15, evaluated for the U.S. Navy, typifies a validation program, and the MIT PACE, being evaluated for the Air Force Avionics Laboratory, typifies a development program.

Validation tests have mandatory test criteria to meet, and flights follow standardized, computer-designed flight paths in aircraft whose performance matches that of the inertial navigator's intended application. Pure (unaided) inertial, single-aided (Doppler-Inertial or Stellar-Inertial) inertial, and Stellar-Inertial-Doppler Navigation Systems are evaluated by standardized test programs. A good example of an optional test, requested by a customer, was the LN–15 Aircraft Carrier Insertion Mode feasibility demonstration. Another optional test in the near future will be position update of a Honeywell strap-down system in conjunction with the Navy Navigation Satellite System. Development tests follow a more leisurely pace and allow unrestricted contractor participation. The object is to uncover design deficiencies and to recommend engineering changes, prior to design freeze and production release.

Testing of aircraft inertial navigation systems usually begins with CIGTF personnel observing system performance in the contractor's own plant. If it doesn't work there after a reasonable length of time, the system is refused. If system performance is satisfactorily demonstrated, a delivery date is established. CIGTF engineers and technicians, along with training command and using command personnel, then spend 10 days to 2 weeks at the contractor's facility learning how the system operates, and how it must be handled and maintained. Meanwhile, back at Holloman, appropriate test bed aircraft are being readied for the installation. The CIGTF inventory consists of two C–130s, three C–131s, two F–106s and two UH–1Bs. The C–5A transport system will be evaluated in a C–141, SRAM in a C–130, and AMSA in a C–141 and C–135. These latter aircraft will be provided by Wright-Patterson AFB and stay at Air Force Missile Development Center for the duration of navigation system testing.


A Norden Gyroscope is strapped-down to a gyro test table for the NASA Advanced Centaur application. The mounting bracket, locally machined to 50 micro-inch tolerance out of a solid magnesium block, has two arc-second orthogonality.

Following is a typical test program, the Litton LN–15 Inertial Autonavigator.

Arriving at the CIGTF on March 1, 1966, mounted in a "standard can" that was especially designed for easy installation in any test aircraft, it went through five eight-hour navigation runs on a Scorsby (ship's motion) table at a frequency of six cycles per minute and six degrees total amplitude swing. These runs were performed on separate days from cold start in an ambient laboratory environment. The system next progressed into the C–130 for static, preflight taxi and shakedown flight tests; afterwards 12 successful data flights were required, 8 flown on range and 4 cross-country to or from Edwards AFB. Finally, the system was installed in the F–106 for evaluation in its intended operational environment. Two shakedown and 15 successful data flights (on 5 different flight paths) were required to complete this phase. Reaction time and ambient temperatures were recorded on all flights, as well as the complete history of failures, time to failure, time to repair, etc. A design deficiency brought to light during acrobatic maneuvers was subsequently corrected by the contractor and validated by the CIGTF, which accounted for the official test completion date of Dec. 9, 1966.

It should also be pointed out that the Optional Test Phase II-B, requested by Naval Air Development Center, Johnsville, (Insertion Mode), was identical to the C–130 Mandatory Phase II-A tests, except that the system was operated using an insertion technique, which simulated a remote system alignment prior to installation in the aircraft. Five data flights were flown on three different flight paths.

An excellent example of a test program that cuts across the entire spectrum of CIGTF capability is the Honeywell SIGN I system (H–408 strapped-down inertial sensor block). In March 1966, the Systems Engineering Group at Wright-Patterson AFB requested the evaluation in connection with its Low-Cost Compatible Midcourse Guidance Program. An extensive evaluation, consisting of laboratory tests and a series of rocket sled tests, was completed. From April through December 1966, the test item was subjected to a total of 11 sled tests. In addition to these tests in the simulated missile environment, numerous pre- and post-sled calibrations were performed in the Gyroscope and Accelerometer Test Laboratories. Both component and system analysts contributed to writing the test plan and reducing the test data.

An unusual event occurred on the 12th sled run. At first motion (FM) plus 9.5 seconds the rocket engine lost its rear slipper beam structure, causing large linear and angular vibrations. The rocket engine motion about the track caused the engine to lose its water brake scoop before reaching the masonite water dams. The sled received almost no braking going over the water dams and went off the north end of the 7-mile track at FM +60.3 seconds at an approximate velocity of 120 miles per hour. A review of the data revealed that the test item had continued to operate after sled impact and until the normal post-run power shutdown. A subsequent thorough laboratory inspection and checkout revealed that the SIGN system and power supply operated properly and displayed no immediate operational problems due to impact, save for a few dents, scrapes and bent connectors. Thus the customer received three tests—sled, flight and impact—all for the price of one.

In the non-inertial area, a comparative evaluation of terminal guidance contrast seekers and logic circuitry is progressing in a specially instrumented C–130 aircraft with two television cameras in the nose. Under the aegis of Aeronautical Systems Division, validation testing, in accordance with the directive of the Director of Defense Research and Engineering, commences several times during the year. Every balloon package sent aloft from Holloman first attains its flight altitude in the CIGTF Stratosphere Chamber. The first Apollo astronaut will sit in a seat and wear a suit that was certified in the CIGTF Environmental Laboratory. Ground was broken on August 31 for a $371,000, 6,200-square-foot addition to the Environmental Laboratory which houses all of the CIGTF vibration equipment. In addition to the linear and angular machinery, 3-axis flight simulator, and 50-foot section of test track, the new building has a 60-foot tower in which zero-gravity drop testing can be performed. This new facility was ready for occupancy in March 1968.

Several one-of-kind items of major facility test equipment exist at Holloman. One is a multi-million dollar 260-inch radius precision centrifuge, designed to test components in a 100-gravity re-entry environment. Another is the stellar-simulator complex that duplicates 90 percent of all the sky's natural environment in a controlled environment area.

Looking to the future, CIGTF workload trends continue to show an exponential increase of equally important and challenging tasks, such as the Navy/Lockheed/Kearfott P3C system, the Air Force Avionics Laboratory LOCATING(Low-Cost of Ownership) system, the Army Advanced Aerial Fire Support System, Boeing 747/AC Electronics Carousel IV system, and the Navy Navigation Satellite system. Since the trend for commercial applications is to use techniques and equipment developed and proven in military systems, the testing of commercial systems, *e.g.*, the AC Electronics Carousel System for the Boeing 747, is expected to play an increasingly important role.

If one had to boil down the CIGTF mission statement to a few. well-chosen words, they might be. "an unbiased, blue-suit test facility dedicated to insuring that the United guidance dollar expended."

Small Business Develops Navy Jungle Rescue Device

The Naval Air Systems Command has adopted a new jungle rescue system that will protect a downed aviator from injury, while being hoisted aboard a hovering helicopter.

The new jungle penetrator is a compact, bullet-shaped device which has a "pop-out" umbrella and two seats for dual rescue. The umbrella acts as a shield to ward off heavy jungle foliage on the way up to the rescue helicopter. The two seats will enable a helicopter crewman to descend and pick up an immobilized airman.

Development of the new system, performed by the Billy Pugh Co. of Corpus Christi, Tex., came in response to requirements announced by the Naval Air Systems Command.

The system presented by the Pugh Co. was evaluated by the Navy during tests at Lakehurst, N.J., and Warner Springs, Calif. Following stateside tests, combat-experienced helicopter crews conducted tests at the Naval Air Station, Cubi Point, Republic of the Philippines.

Equal Opportunity

(*Continued from Page 15*)

- Make it clear in the company's Equal Employment Opportunity policy statement that concrete steps will be taken to eliminate religious discrimination. Local managers should be asked to broaden the base of recruitment.
- Clearly assign and explain the responsibility for implementing the policy, and require periodic evaluations and reports.

A lack of equal management opportunity for reason of religion does not create the same threat to the stability of our social structure as does, for example, color prejudice. But it is not the degree of threat which should lead us to right wrongs; it is the existence of the wrong itself. It is a basic tenet of American democracy that no individual should be limited in the use of his talents except by his own ability and his own integrity. Industry needs a free market in talent for productivity. America needs it for fairness.

ABOUT PEOPLE

DEPARTMENT OF DEFENSE

Ralph Earle II has been selected as Principal Dep. Asst. Secretary of Defense (International Security Affairs). He succeeds **Townsend Hoopes**, now the Under Secretary of the Air Force.

Capt. Hugh D. Murphree, USN, has assumed duties as Chief, Defense Communications Agency Operations Center/National Communications Systems Operations Center, in Arlington, Va. He succeeds **Capt. James W. Short**, USN.

DEPARTMENT OF THE ARMY

Robert E. Jordan III has been selected as General Counsel of the Army. He will also serve concurrently as Special Assistant to the Secretary of the Army for Civil Functions. Mr. Jordan has been serving as Acting General Counsel since September 1967, when he succeeded **Alfred B. Fitt**, who was named last year as Asst. Secretary of Defense (Manpower & Reserve Affairs).

Brig. Gen. Chester H. Johnson is the new Dep. Commander of the U.S. Army Weapons Command, Rock Island Arsenal, Rock Island, Ill.

Project management for Army Material Command Surveillance and Target Acquisition Aircraft Systems (STAAS) has been assigned to **Col. Earl J. Cobey**, who succeeds **Brig. Gen. Lloyd L. Leech Jr.** in the position.

Col. Dana S. Prescott has been assigned to head the Project Management Office for the Army Area Communications System (AACOMS), at Fort Monmouth, N.J.

Col. Robert A. Smith is the new chief of the Technical and Industrial Liaison Office, Office of the Chief of Research and Development.

DEPARTMENT OF THE NAVY

Maj. Gen. Louis Metzger, USMC has assumed duty at Marine Corps Headquarters as Dep. Chief of Staff (Research, Development and Studies).

RAdm. David B. Bell, now serving as Asst. Dep. Chief of Naval Operations (Manpower) has been selected as Dep. Commandant, National War College, Washington, D.C.

Capt. Rowland G. Freeman III has been assigned duty as Dep. Chief of Naval Material (Procurement & Production).

Dr. Thomas S. Amlie has been appointed Technical Dir. for the Naval Weapons Center, China Lake, Calif.

DEPARTMENT OF THE AIR FORCE

The following assignments have been made at USAF headquarters: **Brig. Gen. Henry B. Kucheman Jr.**, Dep. Dir. of Development, Office of Chief of Staff (Research & Development), **Col. Franklin B. Bevard**, Dep. Dir. of Maintenance Engineering, Dep. Chief of Staff (Systems & Logistics); **Col. Jerome J. Jones**, Chief Electronic Warfare Div., Asst. for Reconnaissance, Dep. Chief of Staff (Research & Development); and **Col. Robert F. Trimble**, Asst. for Procurement Management, Asst. Secretary of the Air Force (Installations & Logistics).

The following assignments have been made at Air Force Systems Command: **Col. Lionel C. Allard Jr.**, Program Director, Air Defense Control Warning System Program Office, Electronic Systems Div., L. G. Hanscom Field, Mass.; **Col. Gordon E. Burrell**, Dep. Dir. of Development, Air Force Satellite Control Facility, Los Angeles, Calif.; **Col. Thomas J. Cecil**, Dep. Dir., Systems Test, Air Force Flight Test Center, Edwards AFB, Calif.; **Col. Vaughn E. Denning**, Dir., Gemini B Titan III, Space & Missile Systems Organization (SAMSO), Los Angeles, Calif.; **Col. James C. Fitzpatrick Jr.**, Chief, Atlas/Athena, SAMSO, Los Angeles, Calif.; **Col. Henry C. Howard**, Chief, Plasning Div., Directorate of Ranges & Space Support, Dep. Chief of Staff (Operations), AFC Hq; **Col. Robert J. Kuehn**, Dep. for Communications Systems, Electronic Systems Div., L. G. Hanscom Field, Mass.; **Col. Henry J. Mazur**, Systems Program Dir., Space Defense/Command System Program Office, Electronic Systems Div., L. G. Hanscom Field, Mass.; **Col. James W. Rawers**, Chief, Minuteman II Integration, Engineering Div., Deputy for Minuteman, SAMSO, Los Angeles, Calif.; **Col. Herbert Waldman**, Dir., Data Automation, AFSC Hq; **Col. James S. Carson**, Chief, Aircraft Missile Test Div., Air Force Proving Ground Center, Eglin AFB, Fla.; **Col. John L. Gornall**, Chief, Munitions Test Div., Air Force Proving Ground Center, Eglin AFB, Fla.; **Col. Francis J. Henggeler**, Chief, Procurement Div., Rome Air Development Center, Griffiss AFB, N.Y.; **Col. George H. Sylvester**, Chief, Electronice Test Div., Air Force Proving Ground Center, Eglin AFB, Fla.; **Col. Thomas O. Lawton Jr.**, Asst. Dir., Range Support, Air Force Test Range, Patrick AFB, Fla.; **Col. Roger H. Lengnick**, Systems Program Director 949, SAMSO, Los Angeles, Calif.; and **Col. Robert M. White**, FX Advance Tactical Fighter Programs Officer, Aerospace System Div.

NOTICE

An item on page 17 of the April issue of the *Defense Industry Bulletin* announced the publication of a new Thesaurus of Engineering and Scientific Terms (TEST) and its availability to registered organizations from the Defense Documentation Center (DDC).

DDC has advised that unforeseen printing difficulties has delayed production of the thesaurus and, therefore, requests being received cannot be filled at the present time. The *Bulletin* will carry an item on the thesaurus when it becomes available.

Contractor Performance Evaluation
A Progress Report

Brigadier General Walter J. Woolwine, USA

A little over four years ago, a new technique was introduced in the field of defense contracting. Despite some initial reservations on the part of industry and, for that matter, a few in Government, the Contractor Performance Evaluation (CPE) Program is being extended gradually to incorporate areas previously exempted from this new evaluation procedure.

In the Army Materiel Command (AMC), CPE is regarded as a significant management tool both for Government and the industrial contractors who carry out our annual billion dollar research and development program. In FY 1968, there are more than 100 contracts in the Army's CPE program, more than our overall total for the previous four fiscal years of the program's existence. Also, for the first time, managers of projects previously exempt from CPE are voluntarily requesting coverage, a further indication of CPE's value to AMC's management effort. The other Services have experienced similar interest and growth.

For a number of years, a feeling had been growing in the Military Services that some means of evaluating and producing a reliable record of the performance of contractors was a necessary adjunct to the source selection process. David Bell, former Director of the Budget, emphasized this need in his April 1962 recommendations to the President on the subject of government contracting for research and development. The Bell Report reviewed the government's experience since World War II in contracting with private institutions and enterprises for research and development work, and concluded that something must be done to improve the government's ability to supervise and to evaluate the conduct of research and development efforts. In short, there was an urgent need to know whether the Government was getting a good product for which its money was expended, whether research and development work was being competently managed, and how to select the more competent from the less competent among research and development establishments. It was necessary to have the means to determine the credibility of competitive contractors' proposals.

There was pretty general agreement throughout the defense establishment on the need for evaluating the performance of contractors, and for a standardized approach by all the Services which could yield data readily available to all.

Brig. Gen. Walter J. Woolwine, USA, is the Director of Procurement and Production for the U.S. Army Materiel Command. A graduate of the U.S. Military Academy at West Point, Gen. Woolwine has a master's degree in business administration from Harvard University. He is also a graduate of the Industrial College of the Armed Forces.

The job of coming up with a program was handed to a working group composed of representatives from all the Military Services and the National Aeronautics and Space Administration (NASA). Their effort was not a hasty one. The initial evaluation system evolved was extensively tested in the field. Comments on the details of the program were obtained from the Military Departments and from the 21-man Defense Industry Advisory Council. From this, the CPE Program slowly emerged.

Today, CPE is applicable to research and development contracts of $2 million or more for a single year or totalling $10 million or more, and to follow-on production of $5 million or more annually or totalling $20 million. At present application is mandatory only for those research and development contracts which involve work in the program categories of advanced development, engineering development and operational system development, and for follow-on production contracts before firm specifications are available.

Built around a few simple printed forms, the evaluation report breaks down into four parts:

- Technical promises against achievements.
- Schedule promises against achievements.
- Cost target against actual cost.
- Narrative appraisal.

Evaluations are made periodically during a contract's life and at its conclusion. There is no effort to rate a contractor numerically, nor is there any associated "black list." The goal is to identify the contractual requirements and to objectively evaluate the contractor's effort to meet them—then let the facts speak for themselves.

In actual practice, the CPE procedure is initiated by the project manager. He performs a first level performance evaluation, based on his intimate knowledge of the contractor's effort. This report is sent to the Contractor Performance Evaluation Group (CPEG) at AMC headquarters. The CPEG will either review the report for adequacy and conformance to policy and forward it to the contractor for comment, or the CPEG may, if there are questionable areas, perform an independent field evaluation. On all terminal reports, an independent evaluation by the CPEG is a requirement.

An important fact is that throughout the evaluation process there is opportunity for give and take between the project manager, the CPEG and the contractor, and their views and points of agreement or disagreement all become a part of the written records. Since the contractor sees and is given the opportunity to comment on how the project manager judges his performance, there is little likelihood of unsubstantiated statements finding their way into the evaluation report. It is noteworthy that the contractor's comments are usually made by a key official of the company, sometimes even the president. Again, the effort is to be objective, meaningful and factual—then let the facts speak for themselves.

Upon completion of the evaluation process, reports are sent to the Office of the Assistant Secretary of Defense (Installations and Logistics). Eventually, and most important, they go to the central data bank at the Defense Documentation Center, Alexandria, Va., where they are available for use by source selection agencies of all of the Services and NASA on a need-to-know basis. In fact, use of the data by source selection advisory councils is now mandatory. Others acting in a similar capacity for development or production contracts in excess of $1 million are also required to use this data.

There have been some who have apparently concluded that there has been a waning interest in the program by management, largely due to the evidence of slight use of the data by source selection boards. Actually, the trend is in the other direction. Planners did not originally contemplate widespread use of the data by source selection boards prior to 1968. It takes time for a contract to run its course and for the evaluation to find its way into the data bank, thus the data buildup has, of necessity, been slow. However, the problem is resolving itself as the number of contracts scheduled for evaluation continues to increase. A further indicator of the expanding interest in contractor performance evaluation is the recent response to a survey of CPE training needs. Almost 1,200 field personnel indicated a desire to attend a one-day training session on the program.

The present content of the data bank on these major development contracts is over 700 reports covering over $20 billion of Army, Navy, Air Force and NASA contracts. The number of requests to the data bank in FY 1967 alone totalled 656. All these figures are expanding almost daily.

From the originally intended single purpose of providing data for future source selection, the CPE system is now widely used by project managers for managing their projects. It forces them to do a better job of specifying requirements and pinpointing milestones and, coincidentally, is a valuable source of lessons learned—especially in contract writing.

The contractor benefits as well and, in a manner of speaking, is protected from a too optimistic appraisal of his own capabilities. CPE also is effective in bringing current problems to the attention of company top management. Also, contractors are, quite naturally, sensitive about the "image" being recorded concerning their performance. A number of contractors, who in the past have wanted flexibility in the way of contractual work statements, now are insisting upon more definitive ones with readily measurable contractual milestones. The great potential for this program appears to be quite obvious to industry. It has been noted that a number of large companies have adopted a similar system for evaluating their in-house performance and that of their subcontractors. A look at the record is surely useful in deciding who should get future business.

The real value of the program is directly related to the size of the data bank. While it is growing relatively rapidly, it is still far from achieving its practical potential. To correct this situation, there are a number of actions being taken. The Armed Services Procurement Regulation now also provides for the evaluation of architect-engineer contracts, construction contracts, and supply contracts. The coverage of the supply contracts ($100,000 or more) was just added recently as a DOD-wide program after a pilot test phase by the Defense Contract Administration Services of the Defense Supply Agency. The inclusion of these contracts adds substantially to the coverage of the CPE program.

The Air Force has had for approximately 10 years its 189 system which evaluates small research and development contracts by a simple form, executed by the purchasing and contracting officer or the administrative contracting officer and the technical people. It is coded and mechanized to provide, on request, a tabular printout of all contracts on file for each contractor. The main differences between this system and the DOD CPE Program are the dollar thresholds of $25,000 versus $2 million, the fact that it is only applied upon completion of the contract, and that it is not shown to the contractor except on his request.

The Army thinks so highly of this program that the Missile Command, AMC's largest research and development contracting agency, has requested and received from Air Force a copy of the complete file and updating, and refers to it on a continuing basis. The Army Electronics Command at Fort Monmouth has recently established a system patterned after the Air Force program. This system is about to be made DOD-wide with a threshold of $100,000 and an option in the Military Departments to go below the DOD threshold. This program will be automated, providing a quick, simple readout in the form of a profile of a contractor's record of performance.

The next big step, to which DOD is now giving active attention, is to go beyond the recording of technical, schedule, and cost performance by individual contracts, in order to reflect the complete, current picture of a contractor's capability and the

(Continued on Page 27)

MEETINGS AND SYMPOSIA

MAY

Fifth National Colloquium on **Information Retrieval**, May 3–4, at the University of Pennsylvania, Philadelphia, Pa. Sponsors: Moore School of Electric Engineering, the University of Pennsylvania, Institute of Electrical and Electronic Engineers, Special Interest Group on Information Retrieval, American Documentation Institute Association for Computing Machinery and Frankford Arsenal. Contact: George Schecter, Chief, Objectives Analysis Office, Frankford Arsenal, Philadelphia, Pa. 19137, Phone (215) JE 5–2900, Ext. 3219.

Fourth Naval Material Command **Systems Performance Effectiveness** Conference, "Enhancing the Effectiveness of Fleet Systems—A Problem of Teamwork," May 8–9, at the State Department's West Auditorium, Washington, D.C. Sponsor: Naval Material Command. Contact: Mr. G. W. Neumann,, Executive Secretary, SPE Steering Committee, Naval Ship Systems Command, Code 03511, Washington, D.C. 20360. Phone (202) OX 6–3097.

Universal Aspects of Atmospheric Electricity Conference, May 12–18, in Tokyo, Japan. Sponsors: Air Force Cambridge Research Laboratories, Office of Naval Research and the National Science Foundation. Contact: Capt. J. H. Shock (CRTE), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01730, Phone (617) 274–6100, Ext. 3636.

Silicon Carbide Second International Meeting, May 14–16, at Pennsylvania State University, University Park, Pa. Sponsors: Air Force Cambridge Research Laboratories, Pennsylvania State University and the Carborundum Co. Contact: Mr. C. E. Ryan, Air Force Cambridge Research Laboratories (CRWF), L. G. Hanscom Field, Mass. 01730, Phone (617) 274–6100, Ext. 2234.

1968 International **Quantum Electronics** Conference, May 14–17, at the Everglades Hotel, Miami, Fla. Sponsor: Office of Aerospace Research. Contact: Lt. Col. Robert Kalisch, Air Force Office of Scientific Research, 1400 Wilson Blvd., Arlington, Va. 22209, Phone (202) OX 4–5518.

Aerodynamic Noise Symposium, May 20–21, at Toronto, Canada. Sponsor: Office of Aerospace Research. Contact: Major D. L. Calvert, Air Force Office of Scientific Research (SREM), 1400 Wilson Blvd., Arlington, Va. 22209, Phone (202) OX 4–5568.

Functional Analysis Conference, May 20–24, at the University of Chicago. Sponsor: Office of Aerospace Research. Contact: Dr. R. G. Pohrer, Air Force Office of Scientific Research (SRMM), 1400 Wilson Blvd., Arlington, Va. 22209, Phone (202) OX 4–5264.

JUNE

Electromagnetic Windows Symposium, June 5–7, at Atlanta, Ga. Cosponsors: Air Force Avionics Laboratory and Georgia Institute of Technology. Contact: Mr. Ireland (AVWE), Air Force Avionics Laboratory, Wright-Patterson AFB, Ohio 45433, Phone (513) 257–1110, Ext. 55720.

Society of **Photographic Scientists and Engineers** Annual Conference, June 10–14, at Boston, Mass. Cosponsors: Rome Air Development Center and the Society of Photographic Scientists and Engineers. Contact: Mr. Pohorence (EMIRC), Rome Air Development Center, Griffiss AFB, N.Y. 13440, Phone (503) 330–7210.

Atomic Physics Conference, June 12–15, at New York University. Sponsors: Army Research Office—Durham, AEC, National Science Foundation, Air Force Office of Scientific Research, Office of Naval Research, New York University, Brookhaven National Laboratory and the International Union of Pure and Applied Physics. Contact: Robert Mace, Director, Physics Div., Army Research Office—Durham, Box CM, Duke Station, Durham, N.C. 27706, Phone (919) 286–2285.

Multivariate Analysis Symposium, June 17–22, at Dayton, Ohio. Cosponsors: Aerospace Research Laboratories and Wright State University. Contact: Dr. P. R. Krishnaiah (ARM), Aerospace Research Laboratories, Wright-Patterson AFB, Ohio 45433, Phone (513) 255–3761.

Bioastronautics and the Exploration of Space Fourth International Symposium, June 23–27, at San Antonio, Tex. Sponsor: Aerospace Medical Div., (AFSC). Contact: Dr. Mitchell (AMRS), Aerospace Medical Div., (AFSC), Brooks AFB, Tex. 78235, Phone (512) LE 2–8811, Ext. 3211.

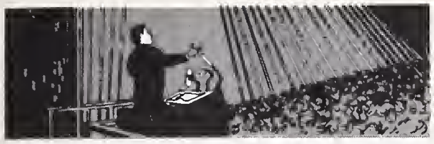
JULY

High Temperature Chemistry Conference, (dates undetermined), in Crystal Springs, Wash. Sponsor: Office of Aerospace Research. Contact: Dr. Donald L. Ball, Air Force Office of Scientific Research (SRC), 1400 Wilson Blvd., Arlington, Va. 22209, Phone (202) OX 4–5337.

Fourth Annual **Marine Technology** Society Conference & Exhibit, July 8–10, in Washington, D.C. Sponsor: Marine Technology Society. Contact: Ted Evans, Conference Management Organization, Inc., Sheraton Park Hotel, 2660 Connecticut Ave., N.W., Washington, D.C. 20008.

Crystal Growth Conference, July 15–19, at the University of Birmingham, England. Sponsors: Air Force Cambridge Research Laboratories, U. K. Ministry of Technology, International Committee on Crystal Growth and the International Union of Pure and Applied Physics. Contact: Charles S. Sahagian (CRWB), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01730, Phone (617) 274–6100, Ext. 3298.

Aurora and Airglow Conference, July 29-Aug. 9, at the Agricultural College of Norway, As, Norway. Sponsors: Office of Aerospace Research, Office of Naval Research, Defense Atomic Support Agency and the Air Force Cambridge Research Laboratories. Contact: Mr. K. W. Champion, Air Force Cambridge Research Laboratories (CRUB), L. G. Hanscom Field, Mass. 01730, Phone (617) 274–6100, Ext. 3033.



FROM THE SPEAKERS ROSTRUM

Excerpt from address by Adm. Thomas H. Moorer, USN, Chief of Naval Operations, at the American Ordnance Assn. Luncheon, Ft. McNair, Washington, D. C., Feb. 19, 1968.

THE CALIBER OF U. S. SEAPOWER

* * *

One of the determining factors in deciding the precise size, number, and caliber of U.S. forces and weapons is necessarily the capability of any potential adversary. With this in mind I would like to give you some of our "competitor's" or "challenger's" viewpoints on naval power and its relation to their country's defense posture. I refer, of course, to the Soviet Union's Navy which is second only to ours in size and firepower.

You might be surprised to find that many of the Soviet views of seapower today are a reflection of our own. As ordnance people, I think you would be particularly interested in some recent statements by Fleet Admiral Gorshkov, the Chief of the Soviet Navy. He made these remarks on the role of the 1968 Soviet Navy as they prepared to celebrate the 50th anniversary of the Soviet Armed Forces.

Admiral Gorshkov proudly stated, that the 1968 Soviet Navy has changed completely . . . with additions of new classes of ships, with increased speed and almost unlimited range; armed with ballistic, winged, anti-aircraft and anti-submarine rockets. The Soviet Chief went on to say that their ships have long-range homing torpedoes and new types of traditional weapons with increased muzzle velocities, greater ranges and better accuracy . . . as well as new rocket equipped aircraft, anti-submarine aircraft and helicopters that can unpreventably hit surface ships and submarines.

Summing up the role of the Soviet Navy, Gorshkov stated that, because of increased capability, the Soviet Navy now has a greater role in the general system of the armed forces and warns that we can expect in the future to see a greater number of Soviet ships in the Atlantic, Pacific and Indian Ocean areas.

It is also interesting to note that the senior Soviet naval officer acknowledges a manpower problem coupled with their growing advances in science and technology. This statement agrees with one of our basic principles and areas of concern. He states that the fleet must get good men with good general and technical educations, and that Navy preinductees must prepare for the critical specialties needed. In short, men are still the heart of any weapon system.

I think the message rings out loud and clear on the forward technical movement of the Soviet naval arsenal. These material increases and improvements in Soviet naval capabilities are tangible evidence which we can measure. We can only assume that the technical growth of the Soviet Navy reflects the Soviet strategy and, thereby, gives us some indication of their political aims.

The caliber of U.S. seapower must be gauged to meet and defeat any potential seapower. As you know this task is a continuing one and, because of the change that is always with us, we must avoid the danger of becoming embalmed in a single weapon or a single weapon system—and I use the word embalmed advisedly—if we are to maintain the necessary power and flexibility of our naval forces.

Adm. Thomas H. Moorer, USN

How do we meet these challenges? The challenges presented by brush fire wars in foreign lands, the challenges which we see ahead of us on the seas and ocean areas of the world, the resultant challenges in the weapons field.

First, because our weapon systems are necessarily sophisticated, it follows, unfortunately, that they are expensive. It further follows that because of this expense, they must be designed for long life yet amenable to improvement and refinement. Reduced to its simplest terms, you and I must concern ourselves with obtaining and operating the required level of firepower at the lowest possible cost. This is certainly evident when we consider that the Defense Department is spending over $70 billion this year. The only answer is more efficient, economical management of all our resources—the effective management of change if you will. Although the Navy has many programs under way toward that end, it is not solely a military responsibility. Industry must accept its commensurate share.

With the press of our many commitments, money is not as readily available today as it has been sometimes in the past. In order to fund a new and promising idea or concept to fruition, we are oftentimes faced with the alternative of taking funds from one worthwhile project and applying them to another. We can no longer have three or four parallel development efforts. This imposes a requirement for better management analysis, and technological application to insure a sound design at an early stage in the development cycle of a weapons system or component. So much for the first challenge in the weapons field, which is basically meeting the problem of expense.

The second challenge is, as you would suspect, quality. The production of higher quality weapons and components by industry is mandatory, if the Navy is to maintain supremacy in its seaborne and airborne environment. As an example, solid state devices have been a boon to our modern torpedo technology. Industry has once again demonstrated that complex and sophisticated torpedoes can be produced in quantity for our anti-submarine warfare forces. Producing a large quantity of weapons such as this to meet high quality specifications is not always easy. In fact, we find in some cases a real reluctance on the part of the manufacturers to tighten manufacturing procedures solely to meet critical specifications for military application. We can, of course, understand the reasons for such reluctance; however, it is a problem that we must solve together.

Similar examples exist in other areas where technical requirements demand that equipment be designed to meet higher specifications, and more stringent operational characteristics. This is a continuing major problem which requires our joint analysis and solution.

Our third and perhaps greatest challenge is the problem related to the difficulties encountered by on-station personnel, as well trained as they are, to keep the weapons "ready to fire."

The availability of the complete system is, as you know, critically dependent upon each component. Each component must be extremely reliable, backed up by a well-trained technician, a well-stocked repair parts locker, and a responsive pipeline. It is extremely easy to describe how to "maintain" a weapon, but extremely complex and difficult to accomplish. We must give more consideration to the man in our systems. We must provide designs which will insure the ability of each human and mechanical component to function smoothly and, thereby, give us a "ready" system.

These are some of the challenges in the weapons field which are evident in our operations today.

Looking to our future, we hope to see built into Navy ships some new types of weapons. We need:

- Lightweight guns and their solid state, digital, computerized fire control systems.
- New anti-air warfare missiles—a surface-to-surface missile, advanced point defense missile, advanced surface-to-air missile, Sea Sparrow, and advanced variations of missiles presently in our locker—Talos being a current example.
- Rocket-assisted projectiles, and high-velocity sabot projectiles with greatly increased ranges, and with mil accuracies of the order of current naval guns. These are now in test and evaluation, and show great promise.
- We need new anti-submarine warfare torpedoes—the Mark 48 (submarine launched) and the Mark 46 (ship and aircraft launched).
- We need new mines of greater versatility, reliability and effectiveness.

All of these needs are representative of complete weapon systems and munitions needed to insure that necessary firepower is available whenever needed to reinforce our tactics and strategies.

In addition to these complete systems, we need to increase our quality and reliability with some new components. Specifically, some examples of areas where particular improvement will pay off large dividends are:

- Some new lightweight body armor for personnel—cockpit and boat crewman protection is vital.
- An unsinkable, light draft, armored small boat with plenty of firepower which is less vulnerable to mines and mortars. In short, we need an efficient unsinkable, self-propelled "log," with guns.
- An automatic recoilless rifle with self-combustible ammunition to increase our available firepower.

There are many other areas in addition to these few I mentioned, where diligent scientific and technical efforts are needed and would be of great assistance to our men in uniform who count on us for the proper tools to survive and win.

I have tried to leave you with three thoughts today. One, that our past record as evidenced in our current operations in Vietnam is outstanding. Two, that the sudden changing attitude and capability of the Soviets to deploy its naval forces clearly emphasizes the need for us to maintain a vigilance and new awareness of the value of a modern Navy, equipped with the best weapon systems that technology can devise and we can afford.

Thirdly, I sincerely believe we must all make a greater, more concerted effort to produce new quality systems, on a reasonable time schedule, that will have the highest degree of reliability and maintainability for our sailors and marines, the users.

In your hands—in a very real sense—rests the future security of the United States and the Navy's future readiness. I am sure that you agree with me that this is not a challenge, or responsibility, which we can take lightly. In the vernacular of the sailors of the old ships of the line, "It's time to move up our big guns."

Navy Develops Multi-Purpose Rescue Ship

The U. S. Navy is developing a new multi-purpose submarine rescue ship (ASR) which will be capable of serving as a surface support ship for rescue submersibles, a submarine rescue ship equipped with the McCann diving chamber, a deep-sea diving support ship, and an operational control ship for salvage operations.

Construction of the new ships is scheduled to begin later this year with delivery to the Fleet in about two and a half years. Ten ships of the new class are now planned with the first two, ASR–21 and ASR–22, to be built by Alabama Drydock and Shipbuilding Co.

The new submarine rescue ships will replace the 10 ships now in service which were built during World War II to modified tug boat designs, and are now obsolete in view of the Navy's progress in development of new deep submersible rescue and salvage equipment.

ASRs of the new class will be manned by a crew of 6 officers and 109 men. The ships will be 251 feet long with a beam of 26 feet. For self-defense, the ship will be armed with two 3-inch/50-caliber dual purpose guns and four .50-caliber machine guns.

Overall design and construction of the ships and their deep sea rescue vehicle handling system is under the direction of the Naval Ship Systems Command. The rescue submersibles, deep-sea diving and salvage systems, and certain related equipment in the new ASRs are being developed by the Navy's Deep Submergence Systems Project with offices in Chevy Chase, Md.

Calendar of Events

May 5-9: Electrochemical Society Meeting, Statler-Hilton Hotel, Washington, D.C.

May 5-10: Society of Plastic Engineers Meeting, New York, N.Y.

May 6-7: Ninth Annual Symposium on Human Factors in Electronics, Institute of Electrical & Electronics Engineers, Marriott Twin Bridges Motor Hotel, Washington, D. C.

May 6-8: Aerospace Electronics Conference, Dayton, Ohio.

May 6-8: Twenty-second annual Technical Conference and Exhibit of the American Society for Quality Control, Sheraton-Park Hotel, Washington, D.C.

May 6-9: Third National Conference on Aerospace Meteorology, New Orleans, La.

May 7: Armed Forces Management Assn. Meeting, Fort McNair Officer's Club, Washington, D.C.

May 7-9: Thirteenth National Meeting of the Society of Aerospace Material and Process Engineers, Chicago, Ill.

May 8-9: American Helicopter Society Annual Forum, Sheraton-Park Hotel, Washington, D.C.

May 8-10: 1968 Electronic Components Conference, Washington, D.C.

May 9: American Ordnance Assn. Annual Meeting, Washington-Hilton Hotel, Washington, D.C.

May 9-11: American Institute of Industrial Engineers Meeting, Tampa, Fla.

May 9-12: Sixth International Air Fair, Biggin Hill, Kent, England.

May 12-15: Twenty-seventh Annual National Conference of the Society of Aeronautical Weight Engineers, Jung Hotel, New Orleans, La.

May 13-16: Thirteenth Annual Corporate Aircraft Safety Seminar, Sheraton-Chicago Hotel, Chicago, Ill.

May 14-16: Armed Forces Communications & Electronics Assn. Annual Convention, Sheraton Park Hotel, Washington, D.C.

May 14-17: 1968 International Quantum Electronics Conference, Everglades Hotel, Miami, Fla.

May 19-23: 1968 News Conference of the Aviation Space Writers Assn., Cocoa Beach, Fla.

May 20-22: International Microwave Symposium, Detroit, Mich.

May 21-24: First International Conference on Titanium, London, England.

May 21-26: International Exposition of Flight and General Aviation Conference, Las Vegas, Nev.

May 22-23: Navy-National Security Industrial Assn. ASW Innerspace Conference, Washington, D.C.

May 22-24: Aerospace Industries Assn. Annual Williamsburg Conference, Williamsburg, Va.

May 23-24: Third Aerospace Mechanisms Symposium, Pasadena, Calif.

June 3-5: Fourth International Air Cargo Forum, San Francisco, Calif.

June 3-6: Electronic Industries Assn. Annual Convention, Hotel Ambassador, Chicago, Ill.

June 4-6: Third Solid Propulsion Conference, Atlantic City, N.J.

June 9-14: Society of Photographic Scientists and Engineers Meeting, Sheraton-Boston Hotel, Boston, Mass.

June 10-12: Fourth International Air Cargo Forum, San Francisco, Calif.

June 10-14: Fourth Propulsion Joint Specialist Conference, Sheraton-Cleveland Hotel, Cleveland, Ohio.

June 12: National Security Industrial Assn. Undersea Warfare Center Briefing, Pasadena, Calif.

June 18-21: Army Science Conference, West Point, N.Y.

June 24-26: Third Thermophysics Conference, Los Angeles, Calif.

June 24-26: Fluid and Plasma Dynamics Conference, Ambassador Hotel, Los Angeles, Calif.

June 26-28: Joint Automatic Control Conference, University of Michigan, Ann Arbor, Mich.

June 26-28: National Security Industrial Assn. Meeeting, U.S. Naval Submarine Base, New London, Conn.

June 27-30: Society of Nuclear Medicine Meeting, St. Louis, Mo.

July 8-9: Management in the Fields of Aerospace Meeting, Montreal, Canada.

July 8-10: Marine Technology Society Fourth Annual Conference & Exhibits, Sheraton Park Hotel, Washington, D.C.

July 15-18: Seventh Reliability and Maintainability Conference, Jack Tar Hotel, San Francisco, Calif.

Contractor Performance Evaluation

(*Continued from Page 23*)

likelihood that he will fulfill his commitments. The aim is to provide a reliable, up-to-date profile of each major contractor expecting to do business with the Government. DOD's managers, as well as procurement officers and source selection people, view this information as vital to their decisions on contractor selection and in determining profit or fee. With the data already available to accomplish this and with the means at hand for rapid recording and retrieval of data, this aim should be attained in the not too distant future.

Evidence from industry of the value of CPE is the fact that a number of companies have established formal CPE programs for subcontract evaluations, patterned closely after the DOD system of objective reporting. Their concepts are similar to the DOD concept: to provide a better means of discerning the contractor who is an effective and efficient performer from the one who is not. By adopting the CPE procedures in their organizations, contractors have indicated that it improves their visibility and organizational discipline in meeting their contractual commitments. CPE is reaching a stage of maturity where the program can realize its objectives as an effective technique for both the Government and industry.

CPE Guide Available

Additional information on the DOD Program of Contractor Performance Evaluation may be obtained from a guide issued by the Defense Department. It is titled, "Guide to Contractor Performance Evaluation (Development and Production)," dated June 1966. It includes administrative procedures governing the preparation, processing and use of Contractor Performance Evaluation Reports.

The guide is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, price 50¢.

Questions on the interpretation of this guide and special cases not covered in it should be referred to the Director of Contractor Performance Evaluation, Office of the Assistant Secretary of Defense (Installations and Logistics), The Pentagon, Washington, D.C. 20301.

STATUS OF FUNDS

DEPARTMENT OF DEFENSE
Military Functions and Military Assistance Program
Quarterly Report

Prepared by:
Directorate for Financial Analysis and Control
Office of the Assistant Secretary of Defense (Comptroller)
Room 3C 839, The Pentagon Phone: (202) OXford 7–2332

NOTE: All expenditure amounts are on a net Treasury basis (gross payments less reimbursement collections), whereas obligations and unpaid obligations are on a gross basis (inclusive of reimbursable activity performed by components of DOD for each other). Therefore, unpaid obligations as of the end of the reporting month cannot be computed from other figures in this report.

Expenditures

Second Quarter, Fiscal Year 1968

(Amounts in Thousands)

DEPARTMENT OF DEFENSE

	Expenditures				Unpaid obligations	
	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	At start of year	As of Dec. 31, 1967
Military Personnel						
Active forces	1,579,856	1,579,318	1,518,241	8,961,735	850,076	1,230,912
Reserve forces	63,813	62,746	66,782	498,957	149,863	105,415
Retired pay	168,153	169,646	175,045	1,010,429	7,622	6,775
Undistributed	–44,668	–16,707	41,829	79,673	—	–79,673
Total—Military Personnel	1,767,155	1,795,002	1,801,899	10,550,795	1,007,561	1,263,428
Operation and Maintenance	1,874,199	1,661,083	1,594,721	9,944,395	[a]3,542,486	3,886,928
Procurement						
Aircraft	765,863	754,704	792,766	4,752,950	[a]9,317,974	8,934,716
Missiles	207,020	167,268	142,433	1,024,050	1,929,015	1,976,246
Ships	119,989	142,728	191,445	805,834	3,049,781	2,914,424
Tracked combat vehicles	47,710	46,651	33,012	221,896	632,680	610,962
Ordnance, vehicles, and related equipment	444,635	515,546	284,221	2,801,283	6,721,730	7,275,084
Electronics and communications	131,398	93,269	116,142	666,948	1,998,176	1,921,144
Other procurement	244,658	177,450	170,311	1,004,212	1,947,502	2,002,177
Undistributed	52,377	–7,548	–26,814	380,996	–386,056	–779,028
Total—Procurement	2,004,649	1,890,066	1,703,517	11,658,169	25,210,802	24,855,723
Research, Development, Test, and Evaluation						
Military sciences	106,156	66,691	71,717	499,428	867,381	857,650
Aircraft	110,648	59,640	122,617	594,899	796,125	892,623
Missiles	236,139	217,340	203,553	1,296,363	1,095,907	1,395,932
Astronautics	99,416	94,594	111,244	623,174	649,793	538,700
Ships	24,784	23,701	14,663	156,966	212,773	215,746
Ordnance, vehicles, and related equipment	37,353	33,556	20,707	179,746	235,442	226,204
Other equipment	73,104	73,899	55,880	384,097	541,757	524,732
Program-wide management and support	40,707	29,773	43,787	231,470	163,038	165,791
Undistributed	–36,012	–3,206	–18,702	97,357	–194,032	–292,900
Total—Research, Development, Test, & Eval.	692,299	595,984	625,466	4,063,499	4,368,185	4,524,481
Military Construction	105,662	120,956	92,446	649,961	1,581,256	1,340,394
Family Housing	45,837	44,910	52,293	272,757	114,964	153,893
Civil Defense	6,468	7,316	11,066	50,275	91,893	77,998
Other—Special Foreign Currency Program	33	730	40	910	2,193	1,451
Revolving and Management Funds	–117,696	23,650	–96,547	152,907	527,834	362,071
Subtotal—Military Functions	6,378,606	6,139,698	5,784,901	37,343,669	36,447,172	36,466,366
Military Assistance	57,672	53,898	39,994	218,795	2,112,357	1,983,725
TOTAL—DEPARTMENT OF DEFENSE	6,436,279	6,193,596	5,824,895	37,562,464	38,559,529	38,450,091

[a] Differs from amounts reported June 30, 1967, due to reclassification of Aircraft and Related Procurement, Navy from "Procurement" to "Operation and Maintenance." Amount $37,300 thousand.
NOTE: Detail may not add to rounded totals.

DEPARTMENT OF THE ARMY

	Expenditures				Unpaid obligations	
	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	At start of year	As of Dec. 31, 1967
Military Personnel						
Active forces	644,881	600,532	601,570	3,527,341	392,872	647,904
Reserve forces	35,676	42,944	39,319	337,861	112,152	76,393
Undistributed	−42,106	82	31,056	59,879	—	−59,879
Total—Military Personnel	638,451	643,558	671,945	3,925,081	505,024	664,418
Operation and Maintenance	849,095	643,850	609,830	3,760,815	1,252,029	1,404,718
Procurement						
Aircraft	92,032	78,841	108,745	556,687	1,303,735	1,019,000
Missiles	29,174	32,227	33,891	162,232	458,264	556,854
Tracked combat vehicles	47,177	46,479	32,993	220,508	611,133	587,484
Ordnance, vehicles, and related equipment	200,333	174,631	100,219	1,172,822	3,387,912	3,620,072
Electronics and communications	55,927	27,330	67,087	241,164	780,554	795,141
Other procurement	86,642	64,843	65,661	344, 966	817,300	796,925
Undistributed	27,176	−17,078	−1,155	353,495	−386,056	−748,712
Total—Procurement	538,462	407,271	407,442	3,051,874	6,972,842	6,626,764
Research, Development, Test, and Evaluation						
Military sciences	11,086	13,712	13,563	74,500	133,665	132,255
Aircraft	11,007	12,291	13,996	80,344	85,463	78,061
Missiles	50,914	50,620	61,445	329,691	435,876	504,822
Astronautics	1,481	1,147	1,488	10,078	15,069	9,050
Ordnance, vehicles, and related equipment	21,689	20,034	11,370	94,293	136,432	133,718
Other equipment	32,850	26,626	24,606	150,108	218,437	210,716
Program-wide management and support	6,442	4,949	7,677	41,271	39,835	46,505
Undistributed	−13,637	−17,095	−3,332	87,400	−194,032	−282,943
Total—Research, Development, Test, & Eval.	121,833	112,285	130,812	867,685	870,745	832,185
Military Construction	51,132	60,059	18,083	375,218	818,076	600,087
Revolving and Management Funds	−40,641	34,001	32,844	212,621	58,732	−54,688
TOTAL—DEPARTMENT OF THE ARMY	2,158,334	1,901,021	1,870,958	12,193,294	10,477,449	10,073,485

DEPARTMENT OF THE NAVY

	Expenditures				Unpaid obligations	
	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	At start of year	As of Dec. 31, 1967
Military Personnel						
Active forces	483,085	524,763	408,378	2,645,895	232,405	279,393
Reserve forces	12,060	11,489	10,992	76,808	19,698	16,786
Undistributed	−7,469	−13,440	28,806	20,024	—	−20,024
Total—Military Personnel	487,676	522,812	448,176	2,742,727	252,103	276,155
Operation and Maintenance	442,393	439,433	419,321	2,700,787	[a]1,234,696	1,261,992
Procurement						
Aircraft	275,883	264,202	306,188	1,583,322	[a]3,505,672	2,913,138
Missiles	35,889	18,330	19,844	198,162	470,557	548,707
Ships	119,989	142,728	191,445	805,834	3,049,781	2,914,424
Tracked combat vehicles	533	172	19	1,388	21,547	23,478
Ordnance, vehicles, and related equipment	154,229	174,566	74,913	749,888	1,611,746	1,849,468
Electronics and communications	43,153	34,534	34,623	223,668	656,377	579,933
Other procurement	73,612	62,456	59,428	374,280	921,116	1,031,566
Undistributed	23,278	5,174	−14,522	22,692	—	−25,469
Total—Procurement	726,565	702,161	671,939	3,959,234	10,236,796	9,835,245
Research, Development, Test, and Evaluation						
Military sciences	36,838	14,165	9,107	109,456	127,323	112,025
Aircraft	23,644	18,908	47,398	164,772	260,838	193,316
Missiles	100,314	64,585	62,273	465,904	293,783	415,201
Astronautics	1,952	2,449	763	12,159	12,677	11,751
Ships	24,784	23,701	14,663	156,966	212,773	215,746
Ordnance, vehicles, and related equipment	15,664	13,522	9,337	85,453	99,010	92,486
Other equipment	11,333	6,225	6,439	57,433	89,328	94,741
Program-wide management and support	14,273	3,395	14,801	63,351	97,989	85,941
Undistributed	809	−1,292	1,379	8,416	—	−8,416
Total—Research, Development, Test, & Eval.	229,611	145,657	166,161	1,123,910	1,193,721	1,212,792
Military Construction	−13,737	11,091	37,159	2,622	269,300	392,910
Revolving and Management Funds	−93,404	−38,121	−87,410	−238,351	462,849	443,793
TOTAL—DEPARTMENT OF THE NAVY	1,779,105	1,783,031	1,655,347	10,290,929	13,649,465	13,422,886

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[a] Differs from amounts reported June 30, 1967, due to reclassification of Aircraft and Related Procurement, Navy from "Procurement" to "Operation and Maintenance." Amount $37,300 thousand.

DEPARTMENT OF THE AIR FORCE

	Expenditures				Unpaid obligations	
	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	At start of year	As of Dec. 31, 1967
Military Personnel						
Active forces	451,890	454,023	508,293	2,788,499	224,799	303,615
Reserve forces	16,077	8,313	16,471	84,288	18,013	12,236
Undistributed	4,907	−3,349	−18,033	−230	—	230
Total—Military Personnel	472,874	458,987	506,731	2,872,557	242,812	316,081
Operation and Maintenance	502,530	502,945	483,844	2,993,509	955,856	1,112,334
Procurement						
Aircraft	388,948	411,661	377,833	2,612,941	4,508,567	5,002,578
Missiles	141,957	116,711	88,698	663,656	1,000,194	870,681
Ordnance, vehicles & related equipment	89,977	166,125	108,841	877,033	1,719,842	1,803,727
Electronics and communications	31,942	31,017	13,886	198,573	555,915	541,925
Other procurement	81,198	47,854	41,044	270,686	164,740	130,314
Undistributed	2,173	4,211	−11,211	4,515	—	−4,553
Total—Procurement	736,194	777,581	619,089	4,627,403	7,949,258	8,344,673
Research, Development, Test, and Evaluation						
Military sciences	15,816	11,961	12,667	81,274	131,619	127,253
Aircraft	75,997	28,441	61,223	349,783	449,824	621,246
Missiles	84,911	102,135	79,835	500,768	366,248	475,909
Astronautics	95,983	90,998	108,993	600,937	622,047	517,899
Other equipment	28,921	41,048	24,835	176,556	233,992	219,275
Program-wide management and support	19,992	21,429	21,309	126,848	25,214	33,345
Undistributed	−23,184	15,181	−16,749	1,541	–	−1,541
Total—Research, Development, Test & Eval.	298,438	311,191	292,112	1,837,706	1,828,944	1,993,387
Military Construction	66,934	47,454	36,226	263,243	473,206	334,065
Revolving and Management Funds	12,250	12,611	−37,906	46,210	6,252	−27,832
TOTAL—DEPARTMENT OF THE AIR FORCE	2,089,219	2,110,770	1,900,095	12,640,627	11,456,328	12,072,708

DEFENSE AGENCIES/OFFICE OF THE SECRETARY OF DEFENSE

	Expenditures				Unpaid obligations	
	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	At start of year	As of Dec. 31, 1967
Military Personnel						
Retired pay	168,153	169,646	175,045	1,010,429	7,622	6,775
Operation and Maintenance	80,182	74,854	81,727	489,285	99,905	107,883
Procurement						
Ordnance, vehicles, and related equipment	96	224	248	1,540	2,230	1,817
Electronics and communications	376	388	546	3,543	5,330	4,145
Other procurement	3,206	2,297	4,178	14,280	44,346	43,372
Undistributed	−250	145	74	294	—	−294
Total—Procurement	3,428	3,053	5,047	19,658	51,906	49,040
Research, Development, Test, and Evaluation						
Military sciences	42,415	26,854	36,380	234,198	474,774	486,117
Military Construction	1,332	2,353	978	8,878	20,674	13,332
Family Housing	45,837	44,910	52,293	272,757	114,964	153,893
Other—Special Foreign Currency Program	33	730	40	910	2,193	1,451
Revolving and Management Funds	4,099	15,160	−4,075	132,428		797
TOTAL—DEFENSE AGENCIES/OSD	345,481	337,559	347,435	2,168,543	772,037	819,289

OFFICE OF CIVIL DEFENSE

Civil Defense	6,468	7,316	11,066	50,275	91,893	77,998
Revolving and Management Funds	—	—	—	—	—	—
TOTAL—OFFICE OF CIVIL DEFENSE	6,468	7,316	11,066	50,275	91,893	77,998

MILITARY ASSISTANCE

Military Personnel	56	56	18	162	525	384
Operation and Maintenance	28,974	12,998	30,660	122,235	289,568	285,827
Procurement						
Aircraft	7,457	6,054	7,301	37,750	235,101	210,202
Missiles	1,090	8	841	2,587	23,650	15,031
Ships	613	2,717	21	4,925	114,450	115,072
Ordnance, vehicles, and related equipment	14,499	1,191	15,886	48,103	264,633	237,675
Electronics and communications	5,298	1,694	1,467	20,667	132,402	118,493
Other procurement	4,693	2,431	4,216	17,934	127,226	123,765
Total—Procurement	33,650	14,095	29,730	131,964	897,462	820,238
Research, Development, Test, and Evaluation	—	—	97	−980	401	79
Military Construction	1,835	4,334	815	10,070	171,824	161,456
Revolving Fund	−2,715	12,463	−12,300	−35,302	764,607	313,781
Undistributed	−4,127	9,952	−9,026	−9,354	−12,030	401,960
TOTAL—MILITARY ASSISTANCE	57,672	53,898	39,994	218,795	2,112,357	1,983,725

Obligations

Second Quarter, Fiscal Year 1968
(Amounts in Thousands)

DEPARTMENT OF DEFENSE

		Obligations				
	Available for obligation	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	Unobligated balance Dec. 31, 1967
Military Personnel						
Active forces	18,995,405	1,542,390	1,558,312	1,680,066	9,479,848	9,515,552
Reserve forces	958,750	62,753	53,824	55,381	453,435	505,315
Retired pay	2,020,000	168,139	169,683	175,245	1,009,379	1,010,621
Total—Military Personnel	21,974,155	1,773,280	1,781,820	1,910,691	10,942,662	11,031,493
Operation and Maintenance	20,822,192,	2,002,618	1,591,757	1,752,237	11,093,390	9,728,802
Procurement						
Aircraft	13,263,901	1,210,120	530,685	856,620	4,588,298	8,675,603
Missiles	3,254,091	223,769	182,486	254,301	1,140,668	2,113,423
Ships	4,884,230	107,612	173,716	96,764	709,429	4,174,801
Tracked combat vehicles	478,168	23,481	5,597	13,425	201,720	276,448
Ordnance, vehicles and related equipment	9,126,574	766,100	521,988	388,911	4,068,481	5,058,093
Electronics and communications	2,262,721	109,580	95,151	88,643	627,974	1,634,747
Other procurement	3,055,172	258,677	206,882	177,133	1,108,987	1,946,185
Undistributed	−43,022	—	—	—	—	−43,022
Total—Procurement	36,281,836	2,699,341	1,716,507	1,875,797	12,445,559	23,836,277
Research, Development, Test, & Evaluation						
Military sciences	1,187,049	86 ,906	80,612	122,925	515,489	671,560
Aircraft	1,485,273	115,810	130,583	44,533	719,083	766,190
Missiles	2,566,553	224,311	129,172	107,297	1,636,050	930,503
Astronautics	1,289,885	117,541	73,642	61,262	576,477	713,408
Ships	377,034	13,613	20,306	24,200	169,057	207,977
Ordnance, vehicles, and related equipment	387,618	21,687	14,069	23,454	177,348	210,270
Other equipment	935,518	56,078	51,326	53,292	376,922	558,596
Program-wide management and support	710,964	52,948	38,096	53,368	320,664	390,300
Emergency Fund	23,982	—	—	—	—	23,982
Undistributed	−242,269	—	—	—	—	−242,269
Total—Research, Development, Test, & Eval.	8,721,605	688,894	537,807	490,329	4,491,089	4,230,516
Military Construction	3,164,103	103,814	76,425	120,591	599,092	2,565,010
Family Housing	874,091	54,286	41,950	50,609	315,380	558,712
Civil Defense	108,603	7,387	4,825	10,759	37,127	71,476
Other—Special Foreign Currency Program	16,344	123	32	13	168	16,176
Subtotal—Military Functions	91,962,929	7,329,743	5,751,125	6,211,023	39,924,466	52,038,462
Military Assistance	394,883	5,672	4,110	−3,458	171,649	223,234
TOTAL—DEPARTMENT OF DEFENSE	92,357,812	7,335,416	5,755,234	6,207,566	40,096,116	52,261,696

	Available for obligation	Obligations				Unobligated balance Dec. 31, 1967
		Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	
Military Personnel						
Active forces	7,874,405	612,889	630,489	686,211	3,853,193	4,021,212
Reserve forces	644,100	42,173	34,094	32,473	300,496	343,604
Total—Military Personnel	8,518,505	655,062	664,583	718,683	4,153,688	4,364,817
Operation and Maintenance	8,068,008	805,145	563,433	725,278	4,238,939	3,829,069
Procurement						
Aircraft	1,234,364	40,848	40,259	65,201	275,670	958,694
Missiles	859,583	29,620	73,618	116,885	293,918	565,665
Tracked combat vehicles	466,051	23,437	5,042	12,968	198,401	267,650
Ordnance, vehicles and related equipment	5,215,009	332,457	296,842	265,812	2,118,480	3,096,529
Electronics and communications	860,795	40,892	31,168	34,171	272,859	587,936
Other procurement	856,930	37,777	61,764	54,150	344,295	512,635
Undistributed	−13,344	—	—	—	—	−13,344
Total—Procurement	9,479,388	505,030	508,694	549,185	3,503,621	5,975,767
Research, Development, Test, & Evaluation						
Military sciences	214,297	8,889	12,053	14,530	85,987	128,310
Aircraft	165,276	4,813	5,983	568	73,629	91,647
Missiles	769,920	26,455	24,433	19,378	405,495	364,425
Astronautics	15,450	940	41	13	4,130	11,320
Ordnance, vehicles and related equipment	227,029	11,515	9,360	5,872	98,402	128,627
Other equipment	455,813	25,753	17,711	26,976	148,207	307,606
Program-wide management and support	94,076	8,832	4,355	6,305	50,378	43,698
Undistributed	−51,300	—	—	—	—	−51,300
Total—Research, Development, Test & Eval.	1,890,561	87,200	73,933	73,642	866,228	1,024,332
Military Construction	1,268,302	31,803	40,701	69,389	271,246	997,057
TOTAL—DEPARTMENT OF THE ARMY	29,224,764	2,084,241	1,851,343	2,136,178	13,033,723	16,191,042

DEPARTMENT OF THE NAVY

		Obligations				
	Available for obligation	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	Unobligated balance Dec. 31, 1967
Military Personnel						
Active forces	5,473,700	454,360	462,519	471,695	2,743,146	2,730,554
Reserve forces	154,620	10,967	8,733	11,241	73,966	80,654
Total—Military Personnel	5,628,320	465,326	471,252	482,937	2,817,113	2,811,207
Operation and Maintenance	5,672,198	574,139	460,678	439,408	2,978,582	2,693,616
Procurement						
Aircraft	3,973,039	109,868	150,485	467,115	1,002,803	2,970,236
Missiles	774,243	63,942	30,664	43,254	286,445	487,798
Ships	4,884,230	107,612	173,716	96,764	709,429	4,174,801
Tracked combat vehicles	12,117	44	555	457	3,319	8,798
Ordnance, vehicles and related equipment	2,218,191	383,821	120,349	97,430	987,956	1,230,235
Electronics and communications	818,205	31,754	30,936	34,647	149,306	668,899
Other procurement	1,567,811	148,597	71,756	85,468	509,388	1,058,423
Undistributed	−448,947	—	—	—	—	−448,947
Total—Procurement	13,798,889	845,641	578,461	825,136	3,648,649	10,150,243
Research, Development, Test, and Evaluation						
Military sciences	203,309	14,260	8,554	11,211	97,489	105,820
Aircraft	377,724	12,546	12,456	15,374	97,365	280,359
Missiles	813,650	33,215	78,448	18,513	592,639	221,011
Astronautics	21,321	359	5,332	317	11,301	10,020
Ships	377,034	13,613	20,306	24,200	169,057	207,977
Ordnance, vehicles and related equipment	160,589	10,172	4,709	17,582	78,946	81,643
Other equipment	155,533	8,883	13,395	10,715	63,798	91,735
Program-wide management and support	350,702	25,814	17,775	24,546	128,097	222,605
Undistributed	−78,700	—	—	—	—	−78,700
Total Research, Development, Test & Eval.	2,381,162	118,862	160,975	122,458	1,238,692	1,142,470
Military Construction	1,075,638	53,778	27,408	35,766	201,634	874,004
TOTAL—DEPARTMENT OF THE NAVY	28,556,208	2,057,746	1,698,774	1,905,705	10,884,670	17,671,538

DEPARTMENT OF THE AIR FORCE

	Available for obligation	Obligations				Unobligated balance Dec. 31, 1967
		Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	
Military Personnel						
Active forces	5,647,300	475,141	465,304	522,160	2,883,509	2,763,791
Reserve forces	160,030	9,613	10,997	11,667	78,973	81,057
Total—Military Personnel	5,807,330	484,753	476,302	533,826	2,962,482	2,844,848
Operation and Maintenance	6,046,858	529,221	488,351	502,680	3,354,063	2,692,795
Procurement						
Aircraft	8,056,498	1,059,407	339,941	324,304	3,309,825	4,746,673
Missiles	1,620,265	130,207	78,204	94,162	560,305	1,059,960
Ships	—	—	—	—	—	—
Ordnance, vehicles and related equipment	1,689,671	49,803	104,448	25,652	960,918	728,753
Electronics and communications	570,284	36,604	32,554	19,734	203,451	366,833
Other Procurement	562,380	68,125	69,853	35,184	236,260	326,120
Undistributed	417,712	—	—	—	—	417,712
Total—Procurement	12,916,810	1,344,145	625,000	499,037	5,270,760	7,646,051
Research, Development, Test & Evaluation						
Military sciences	184,905	25,125	13,213	11,982	85,240	99,665
Aircraft	942,273	98,451	112,144	28,591	548,089	394,184
Missiles	982,983	164,641	26,291	69,406	637,916	345,067
Astronautics	1,253,114	116,242	68,269	60,932	561,046	692,068
Other equipment	324,172	21,442	20,220	15,601	164,917	159,255
Program-wide management and support	266,186	18,302	15,966	22,517	142,189	123,997
Undistributed	−112,269	—	—	—	—	−112,269
Total—Research, Development, Test & Eval.	3,841,362	444,200	256,106	209,026	2,139,395	1,701,967
Military Construction	693,859	18,184	8,332	15,441	124,676	569,183
TOTAL—DEPARTMENT OF THE AIR FORCE	29,306,219	2,820,504	1,854,090	1,760,010	13,851,376	15,454,843

DEFENSE AGENCIES/OFFICE OF THE SECRETARY OF DEFENSE

		Obligations				
	Available for obligation	Oct. 1967	Nov. 1967	Dec. 1967	Cum. thru Dec. 31, 1967	Unobligated balance Dec. 31, 1967
Military Personnel						
Retired Pay	2,020,000	168,139	169,683	175,245	1,009,379	1,010,621
Operation and Maintenance	1,035,128	94,112	79,296	84,871	521,806	513,322
Procurement						
Ordnance, Vehicles and related equipment	3,703	19	349	17	1,127	2,576
Electronics and communications	13,437	330	493	91	2,358	11,079
Other procurement	68,051	4,178	3,509	2,331	19,044	49,007
Undistributed	1,557	—	—	—	—	1,557
Total—Procurement	86,748	4,526	4,352	2,439	22,529	64,219
Research, Development, Test, and Evaluation				85,202	246,773	261,747
Military sciences	508,520	38,632	46,792			
Emergency Fund	100,000	—	—	—	—	100,000
Undistributed	—	—	—	—	—	—
Total—Research, Development, Test & Eval.	608,520	38,632	46,792	85,202	246,773	361,747
Military Construction	126,303	49	−16	−5	1,536	124,766
Family Housing	874,091	54,286	41,950	50,609	315,380	558,712
Other—Special Foreign Currency Program	16,344	123	32	13	168	16,176
TOTAL—DEFENSE AGENCIES/OSD	4,767,134	359,866	342,092	398,372	2,117,571	2,649,563

OFFICE OF CIVIL DEFENSE

Civil Defense	108,603	7,387	4,825	10,759	37,127	71,476

MILITARY ASSISTANCE

Military Personnel	21	−2	—	−12	21	—
Operation and Maintenance	310,696	10,775	4,306	2,966	118,495	192,201
Procurement						
Aircraft	13,114	−1,644	−175	77	12,851	263
Missiles	−5,867	−262	—	−5,370	−6,032	165
Ships	5,609	−316	—	−199	5,547	62
Ordnance, vehicles and related equipment	21,139	−265	—	−2,347	21,142	−3
Electronics and communications	6,760	−2,716	—	−120	6,758	2
Other procurement	14,932	143	−21	1,453	14,474	458
Total—Procurement	55,687	−5,061	−196	−6,506	54,740	947
Research, Development, Test, and Evaluation	−1,300	—	—	—	−1,301	1
Military Construction	29,702	−41	—	101	−298	30,000
Undistributed	78	—	—	−7	−7	85
TOTAL—MILITARY ASSISTANCE	394,883	5,671	4,110	−3,458	171,649	223,234

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Others may purchase these documents at a price of $3 each (microfiche 65 cents), unless otherwise indicated, from:

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Life Support Needs for Vietnam Airmen Get Top Priority

Each day certain war reports from Vietnam are rushed to an office at the Aeronautical Systems Division (ASD), Air Force Systems Command, Wright-Patterson AFB, Ohio, and screened by a newly-formed group of engineers, physicians and combat-experienced Air Force officers.

The analysts belong to an organization called the Life Support System Program Office, which works closely with ASD's Deputy for Limited War in developing technology for Southeast Asia operations.

Mission of the life support system analysts is to look for hints of equipment failure or personal suffering from climate, terrain, or exposure, and to develop equipment which will alleviate these problems.

The office has already been operating for more than 2 years and has tackled more than 100 separate projects. Most are designed to bolster the chances of survival of airmen who go down in the sea, mountains, or jungle.

Among the more urgent projects are:

- A better system for getting airmen out of crippled planes.
- A miniature, thoroughly reliable and long-lived radio battery.
- Lightweight body armor for cargo and helicopter crewmen.
- A method of supplying enough concentrated oxygen for two men in an aircraft.
- Improved flying helmets.
- Fire resistant gloves and flying suits.

New equipment must be reliable, simple to operate, timely, logistically supportable, and not too expensive. In addition, no solution, however good, can be allowed to hamper the airman's basic duty of operating effectively against the enemy.

Other items being developed to fill the needs of U.S. troops in Vietnam include:

- A forest penetrator rescue unit, a hinged, plastic hood that protects a survivor from injury while being hoisted out of the jungle.
- A pararescue transceiver helmet to provide pararescuemen with voice communications with rescue aircraft.
- A parachute lowering device which will permit a man to reach the ground at a controlled rate of descent.
- Flares and launchers that can shoot well above the jungle foliage.

Also in development are such items as a compact life preserver that will fit under a man's arm; a harness for men who must work at the open doors of cargo aircraft and helicopters; automatic actuators to release life rafts and survival kits at a preset altitude during parachute descent; one-man life rafts; lap belts; chart holders; and fire resistant clothing.

To repair life rafts, a flexible adhesive patch is being sought that will work equally well whether wet or dry, and which can be applied with one hand.

Many recommendations are discarded, not because they are unworkable or unnecessary but because they have a limited use. Others are abandoned because airmen won't use them. Still others are scrapped because their value is not obvious to a man shaken up by a fall into strange or hostile environment. Because an airman's life may depend on how quickly he can learn to use the equipment in his kit, simplicity and obviousness are an essential ingredient of a survival package.

Colonel A. P. Lovelady, who formerly directed air rescue operations in Vietnam, is head of the Life Support Office at Wright-Patterson.

Retired Officers Set Convention in Florida, Nov. 13-15

The Retired Officers Association will hold its 19th biennial convention at the Jack Tar Hotel in Clearwater, Fla., Nov. 13-15, 1968.

The convention program includes presentations and exhibits by the Military Departments, designed to bring retired alumni up to date on current and future operational concepts of the Services.

Free exhibit space is being offered by the association this year and defense-oriented industries are invited to exhibit their products.

Interested exhibitors should contact Major General A. T. Wilson, Jr., USAF (RET.) or Lieutenant Colonel Sheldon Hicks, USAR (Ret.), Retired Officers Association, 1625 Eye St. NW, Washington, D.C. 20006, telephone (202) 783-8755.

Cambridge Research Lab Adds New Branch

The Air Force Cambridge Research Laboratory has increased its branches from nine to ten with the addition of a newly established Ionospheric Physics Laboratory.

The new laboratory was formed by reorganizing the radio astronomy programs of the Space Physics Laboratory and the ionospheric programs of the Upper Atmosphere Physics Laboratory under one branch.

All other missions of the laboratories branches will remain the same under the reorganization except for a name change redesignating the Upper Atmosphere Physics Laboratory as the Aeronomy Laboratory.

Christos G. Stergis, previous Director of the Upper Atmosphere Physics Laboratory, will remain as head of the Aeronomy Laboratory.

Lieutenant Colonel Thomas D. N. Douthit, previous Director of the Space Physics Laboratory, now heads the new Ionospheric Physics Laboratory.

Adolph S. Jursa, previously assigned to the Upper Atmosphere Physics Laboratory, has been selected to serve as Acting Director of the Space Physics Laboratory.

AFCEA Annual Meeting Set for May 14–16

The annual convention and exhibition of the Armed Forces Communications and Electronics Association will be held May 14–16 at the Sheraton Park Hotel, Washington, D.C.

Admiral Thomas H. Moorer, Chief of Naval Operations, will speak at the keynote luncheon on May 14, and Lieutenent General Alfred D. Starbird, USA, Sentinel System Manager, will address the industrial luncheon on May 16. Banquet speaker on the evening of May 15 will be Lawrence A. Hyland, Vice President and General Manager of Hughes Aircraft Co.

Technical panel presentations on various aspects of communications and electronics are planned for each of the three days of the convention.

For additional information the contact is: W. J. Baird, Armed Forces Communications and Electronics Association, 1725 Eye St. NW, Washington, D.C. 20006, telephone (202) 296-3033.

SELECTED DEFENSE DEPARTMENT ECONOMIC INDICATORS

(Dollars in Millions; Manpower in Thousands; Quarters by Calendar Year)

	1966				1967							1968	
	I	II	III	IV	I	II	III	Oct	Nov	Dec	IV	Jan	Feb
I. *Military Prime Contract Awards*													
Aircraft	$1,945	$2,989	$2,696	$2,262	$2,102	$3,049	$2,513	$1,249	$578	$805	$2,632	$442	$478(P)
Missile & Space Systems	1,040	987	1,314	861	1,230	1,166	1,580	323	429	316	1,068	348	475(P)
Ships	355	491	876	239	679	407	417	153	147	110	410	109	122(P)
Weapons & Ammunition	555	1,486	692	940	818	1,769	1,104	454	451	439	1,344	226	373(P)
Electronic & Communications Equip.	918	1,574	666	915	971	1,848	816	272	247	305	824	359	220(P)
Other Hard Goods	843	1,842	660	1,029	915	1,564	785	252	153	248	653	246	351(P)
Soft Goods	709	922	1,078	989	638	652	1,056	175	118	198	491	437	137(P)
Construction	207	392	198	150	232	626	232	56	44	113	213	61	63(P)
All Other	1,406	1,963	2,356	1,639	1,605	1,987	2,335	522	486	649	1,657	457	551(P)
Total (Excl. Work Outside U. S.)	7,978	12,646	10,536	9,024	9,190	13,068	10,838	3,456	2,653	3,183	9,292	2,685	2,770(P)
Total Seasonally Adjusted	8,703	10,144	10,716	10,149	10,171	10,667	10,961	3,626(R)	3,308(R)	3,479(R)	10,413(R)	2,887(R)	3,445(P)
Work Outside U. S.	521	1,195	856	672	453	834	891	193	117	145	455	288	139(P)
II. *Gross Obligations Incurred*													
Operations	8,326	9,604	10,426	9,702	10,229	11,435	11,224	3,776	3,374	3,663	10,812	3,798	
Procurement	4,374	8,539	5,368	5,276	5,113	8,948	6,154	2,699	1,717	1,876	6,292	1,784	
Other	2,429	3,470	3,453	2,230	2,519	3,510	3,420	860	665	669	2,194	863	
Total	15,129	21,613	19,247	17,208	17,861	23,893	20,798	7,335	5,755	6,208	19,298	6,445	
III. *Gross Unpaid Obligations Outstanding*													
Operations	3,828	3,777	4,792	5,024	4,644	4,513	5,267	5,270	5,050	5,150	5,150	5,127	
Procurement	18,023	22,119	22,736	23,173	22,780	25,248	24,925	25,423	24,982	24,856	24,856	24,197	
Other*	5,625	5,942	8,026	7,253	6,996	7,506	7,978	7,854	7,609	7,360	7,360	7,329	
Total*	27,476	31,838	35,554	35,450	34,420	37,267	38,170	38,547	37,641	37,366	37,366	36,653	
IV. *Net Expenditures*													
Operations	7,689	9,076	8,968	9,087	10,002	10,731	10,001	3,641	3,456	3,397	10,494	3,550	
Procurement	3,651	3,886	4,392	4,264	5,074	5,282	6,060	2,005	1,890	1,704	5,598	2,274	
Other	2,757	2,647	2,484	3,092	3,160	2,001	3,047	790	847	724	2,363	1,153	
Total	14,097	15,609	15,844	16,443	18,236	18,014	19,108	6,436	6,194	5,825	18,455	6,977	
V. *DOD Personal Compensation*													
Military	3,181	3,249	3,551	3,606	3,624	3,646	3,842	1,264	1,297	1,411	3,972	1,338	
Civilian	1,937	2,015	2,105	2,135	2,170	2,248	3,271	773	772	787	2,332	828	770(P)
Total	5,118	5,264	5,656	5,741	5,794	5,894	6,113	2,037	2,069	2,198	6,304	2,166	
VI. *Outstanding Payments*													
Advance Payments	66	79	90	83	92	80	110				134		
Progress Payments	4,402	4,346	4,750	5,461	5,981	6,765	7,179				7,491		
Total	4,468	4,425	4,840	5,544	6,073	6,845	7,289				7,625		
VII. *Strength (Manpower)*													
Military	2,969	3,094	3,229	3,334	3,371	3,377	3,412	3,416	3,412	3,398	3,398	3,427(P)	
Civilian	1,088	1,138	1,184	1,230	1,268	1,303	1,274	1,277	1,277	1,271	1,271	1,267	1,265(P)

NA = Not Available.
P = Preliminary.
R = Revised.
* = Entire series adjusted to exclude revolving funds.
Note: Open spaces for Indicators other than No. VI indicate information not available at time of publication.
Indicator No. VI information available only on a quarterly basis. Totals may not add due to rounding.

Directorate for Statistical Services
OASD (Comptroller)
March 27, 1968

DEFENSE PROCUREMENT

Contracts of $1,000,000 and over awarded during the month of March 1968:

DEFENSE SUPPLY AGENCY

1—**Coastal States Petrochemical Co.**, $1,390,348. 14,600,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1282.

—**Signal Oil & Gas Co.**, Houston, Tex. $3,212,500. 35,000,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1648.

—**Southwestern Oil & Refining Co.**, Corpus Christi, Tex. $4,312,140. 46,200,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1649.

—**Atlantic Richfield, Co.**, Los Angeles, Calif. $2,220,750. 21,000,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1013.

4—**Apparel Corp. of America**, Knoxville, Tenn. $4,049,603. 736,675 coated nylon twill ponchos. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1710.

—**Electro Plastics Fabrics**, Pulaski, Va. $1,311,179. 236,675 coated nylon twill ponchos. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1711.

6—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for aviation gasoline:

Humble Oil & Refining Co., Houston, Tex. $16,775,863. 117,933,000 gallons of grade 115/145. DSA 600–68–D–1400.

Mobile Oil Corp., New York, N.Y. $14,222,481. 97,321,000 gallons of grade 115/145 and 2,800,000 gallons of grade 80/87. DSA 600–68–D–1401.

Atlantic Richfield Co., Los Angeles, Calif. $5,545,924. 33,814,000 gallons of grade 115/145. DSA 600–68–D–1395.

Texaco, Inc., New York, N.Y. $5,253,444. 37,700,000 gallons of grade 115/145. DSA 600–68–D–1406.

Gulf Oil Corp., New York, N.Y. $3,966,228. 28,140,000 gallons of grade 115/145. DSA 600–68–D–1399.

Phillips Petroleum Co., Bartlesville, Okla. $3,531,849. 24,302,000 gallons of grade 115/145 and 20,000 gallons of grade 100/130. DSA 600–68–D–1402.

Union Oil Co., Los Angeles, Calif. $2,783,400. 17,061,000 gallons of grade 115/145 and 30,000 gallons of grade 80/87. DSA 600–68–D–1408.

Texas City Refining, Inc., Texas City, Tex. $1,176,000. 18,400,000 gallons of grade 115/145. DSA 600–68–D–1407.

—**Standard Oil Co.**, Louisille, Ky. $2,569,420. 18,432,000 gallons of grade 115/145. DSA 600–68–D–1404.

—**Standard Oil Co.**, San Francisco, Calif. $2,507,643. 847,000 gallons of combat Type II automotive gasoline and 17,224,000 gallons of grade DF-A Arctic diesel fuel. DSA 600–68–C–1195.

8—**Genesco, Inc.**, Nashville, Tenn. $4,151,551. 486,000 pairs of tropical combat boots. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1353.

—**Hi-Pals Footwear, Inc.**, Waynesville, N.C. $2,022,694. 239,940 pairs of tropical combat boots. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1351.

—**Randolph Mfg. Co.**, Randolph, Mass. $1,724,000. 200,000 tropical combat boots. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1352.

—**Delta Petroleum Co.**, New Orleans, La. $1,556,987. 3,916,757 gallons of lubricating oil. Defense Fuel Supply Center, Alexandria, Va. DSA 640–68–D–0048.

11—**Sparling Mills**, Greenville, R.I. $1,125,960. 6,000,000 polypropylene sandbags. Defense General Supply Center, Richmond, Va. DSA 400–68–C–4471 P001.

—**Pioneer Bag Co.**, Kansas City, Mo. $8,753,085. 45,000,000 polypropylene sandbags. Defense General Supply Center, Richmond, Va. DSA 400–68–C–4469 P001.

—**Lite Industries**, Paterson, N.J. $1,420,000. 7,100,000 polypropylene sandbags. Defense General Supply Center, Richmond, Va. DSA 400–68–C–4480 P001.

—**Cavalier Bag Co.**, Lumberton, N.C. $3,196,428. 15,900,000 polypropylene sandbags. Defense General Supply Center, Richmond, Va. DSA 400–68–C–4484 P001.

—**Uniplex, Inc.**, Paramount, Calif. $4,437,158. 22,000,000 polypropylene sandbags. Defense General Supply Center, Richmond, Va. DSA 400–68–C–4476 P001.

12—**Reflective Laminates, Inc.**, North Hollywood, Calif. $1,086,533. 8,002 sets of small arms protectve body armor for crewmen, and 155 separate plates for such armor. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1796.

—**West Point-Pepperell, Inc.**, New York, N.Y. $1,502,399. 3,000,000 white cotton bath towels. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1782.

13—**Republic Steel**, Chicago, Ill. $3,262,796. 340,938 spools of barbed wire. Defense Construction Supply Center, Columbus, Ohio. DSA 700–68–D–0056–0006.

14—**South Jersey Clothing Co.**, Minotola, N.J. $1,181,073. 54,730 men's wool serge coats. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1803.

19—**Glenn Barry Mfg., Inc.**, Commerce, Okla. $1,292,738. 1,629,200 pairs of men's cotton sateen trousers. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1849.

21—**Shell Oil Co.**, Nef York, N.Y. $2,108,880. 1,500,000 barrels of number six fuel oil. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1454.

25—**Humble Oil & Refining Co.**, Houston, Tex. $2,319,920. 24,400,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1671.

—**Texaco, Inc.**, New York, N.Y. $5,951,610. 63,000,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1672.

—**Gulf Oil Corp.**, New York, N.Y. $1,590,960. 16,800,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1670.

—**Coastal States Petrochemical Co.**, Houston, Tex. $2,032,905. 21,000,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1668.

—**Cities Service Oil Co.**, New York, N.Y. $1,612,917. 16,800,000 gallons of JP-4 jet fuel. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1667.

—**Gibraltar Fabrics**, Brooklyn, N.Y. $2,977,280. 421,980 poncho liners. Defense Personnel Support Center, Philadelphia, Pa. DSA 100–68–C–1883.

—**Tony Downs Food Co.**, St. James, Minn. $1,022,266. 358,920 dozen cans of boned chicken. Defense Personnel Support Center, Philadelphia, Pa. DSA 130–8–C–22023.

—**Boothe Packing Co.**, Modesto, Calif. $1,210,305. 1,531,560 cases of individual combat meals. Defense Personnel Support Center, Philadelphia, Pa. DSA 130–8–C–092A3.

—**Aluminum Co. of America**, Pittsburgh, Pa. $2,335,398. 7,674,000 lbs. of aluminum powder. Defense General Supply Center, Richmond, Va. DSA 400–68–C–5117.

—**Valley Metallurgical Processing Co.**, Essex, Conn. $1,972,380. 6,500,000 lbs. of aluminum powder. Defense General Supply Center, Richmond, Va. DSA 400–68–C–5116.

26—**Remington Oil Co.**, New York, N.Y. $2,253,960. 1,096,000 barrels of number six fuel oil. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1452.

—**Gulf Oil**, Houston, Tex. $1,333,447. 207,700 barrels of diesel fuel and 51,700 barrels of number six fuel oil. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1437.

27—**Humble Oil & Refining Co.**, Houston, Tex. $2,663,052. 42,850 barrels of diesel fuel and 1,154,300 barrels of number six fuel oil. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1140.

—**Mobil Oil Corp.**, New York, N.Y. $1,604,739. 5,000 gallons of gasoline; 213,000 barrels of diesel fuel and 325,350 barrels of number six fuel oil. Defense Fuel Supply Center, Alexandria, Va. DSA 600–68–D–1446.

—**Lukens Steel Co.**, Coatesville, Pa. $5,151,269. 18,028,014 lbs. of HY-80 alloy steel plate. Defense Industrial Supply Center, Philadelphia, Pa. DSA 500–68–C–C114.

28—**Eastman Kodak Co.**, Rochester, N.Y. $2,851,774. Seventy-nine line items of aerial film and associated chemicals. Defense General Supply Center, Richmond, Va. DSA 400–68–C–0253–0001.

29—**Chase Bag Co.**, New York, N.Y. $2,343,540. 11,223,000 polypropylene sandbags (containerized). Defense General Supply Center, Richmond, Va. DSA 400–68–C–5178.

—**Crowley Industrial Bag Co.**, Crowley, La. $1,505,000. 7,000,000 polypropylene sandbags (containerized). Defense General Supply Center, Richmond, Va. DSA 400–68–C–5176.

—**Continental Bag Co., Inc.**, Growley, La. $1,372,565. 7,000,000 polypropylene sandbags (containerized). Defense General Supply Center, Richmond, Va. DSA 400–68–C–5177.

DEPARTMENT OF THE ARMY

1—**Philco Ford Corp.**, Newport Beach, Calif. $15,697,600. Chaparral fire units and components. Army Missile Command, Huntsville, Ala. DA–AH01–68–C–0548.

—**General Motors**, Indianapolis, Ind. $4,650,665. Turbo shaft engines for OH-6A helicopters. Aviation Materiel Command, St. Louis, Mo. DA–AJ01–66–C–1289.

—**FMC Corp.**, Santa Clara, Calif. $17,039,000. Metal parts for high explosive projectiles. Army Procurement Agency, Oakland, Calif. DA–AG05–68–C–0058.

—**Mattner & McCutchen—Osberg Construction Co.**, Seattle, Wash. $3,491,520. Construction of a ventilation system at the Flathead Tunnel on the Great Northern Railroad. Libby, Mont. Engineer Dist., Seattle, Wash. DA–CW67–68–C–0049.

—**General Time Corp.**, La Salle, Ill. $1,030,425. Fuzes for artillery ammunition. Frankford Arsenal, Philadelphia, Pa. DA–36038–AMC–4243A.

CONTRACT LEGEND

Contract information is listed in the following sequence: Date—Company — Value — Material or Work to be Performed—Location of Work Performed (if other than company plant) — Contracting agency.

—**Day & Zimmerman, Inc.**, Philadelphia, Pa. $17,736,221. Loading, assembling and packing of miscellaneous ammunition items. Texarkana, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-11-173-AMC-00114 (A).

—**Philco Ford Corp.**, Newport Beach, Calif. $8,250,000. Shillelagh guided missiles. Army Missile Command, Huntsville, Ala. DA-AH01-68-C-1402.

—**Martin Marietta Corp.**, Orlando, Fla. $9,406,576. Shillelagh guided missiles. Army Missile Command, Huntsville, Ala. DA-AH01-68-C-1020.

—**Continental Motors**, Muskegon, Mich. $6,247,038. Multi-fuel engines assemblies for 2½-ton trucks. Tank Automotive Command, Warren, Mich. DA-AE07-68-C-1657.

—**Teledyne Systems**, Northridge, Calif. $3,600,000. Five sets of central computer complex components with associated equipment for use in AH-56A aircraft. Electronics Command, Fort Monmouth, N.J.

4—**Dan Catuto Co.**, San Jose, Calif. $2,965,733. Improvements on Walnut Creek Channel, Walnut Creek, Calif. Engineer Dist., Sacramento, Calif. DA-CW05-68-C-0052.

—**Mason & Hanger, Silas Mason & Co.**, Lexington, Ky. $2,353,313. Operation of the Cornhusker Army Ammunition Plant, Grand Island, Neb. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-11-173-AMC-00019 (A).

—**Sargent-Fletcher Co.**, El Monte, Calif. $1,286,828. Spray tanks. Edgewood Arsenal, Edgewood, Md. DA-AA15-67-C-0649.

—**National Union Electric Corp.**, Bloomington, Ill. $1,046,400. Metal parts for a classified end item. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0055.

5—**LTV Aero-Space Corp.**, Warren, Mich. $2,477,878. Ground support equipment for the Lance missile system. Army Missile Command, Huntsville, Ala. DA-20-113-AMC-01052 (Z).

—**Cabot Corp.**, Pampa, Tex. $1,126,872. Machining of steel tube forginings into gun barrels for 152mm cannons. Kingsmill, Tex. Watervliet Arsenal, Watervliet, N.Y. DA-AF07-68-C-0086.

—**White Motors**, Lansing, Mich. $1,002,282. Engineering services for 2½-ton trucks. Tank Automotive Command, Warren, Mich. DA-AE07-67-C-5674

6—**Gunther-Shirley-Lane**, Sherman Oaks, Calif. $5,181,140. Completion of a power house at Robert S. Kerr Lock and Dam on the Arkansas River, near Sallisaw, Okla. Engineer Dist., Tulsa, Okla. DA-CW-56-58-C-0107.

8—**Bell Aerospace Corp.**, Fort Worth, Tex. $20,752,354. Light observation helicopters. Wichita, Kan. and Tarrant County, Tex. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-68-C-1699.

—**A. O. Smith Corp.**, Chicago, Ill. $3,375,300. 750-lb. bomb metal parts. Bellmead, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0078.

—**Bell Aerospace Corp.**, Fort Worth, Tex. $3,310,368. UH-1 helicopter rotary wing blades. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-68-A-0022.

—**Texas Instruments, Inc.**, Dallas, Tex. $1,000,000. Classified electronics equipment. Electronics Command, Fort Monmouth, N.J.

11—**Raytheon Co.**, Andover, Mass. $1,549,500. Oscillators for Hawk missile system ground equipment. Army Missile Command, Huntsville, Ala. DA-AH01-68-C-0061.

—**Ballenger Paving Co.**, Greenville, N.C. $2,120,098. Construction of a barricaded rail holding yard for 350 rail cars, including support utilities, earth barricade and railroad tracks. Sunnypoint Army Terminal, N.C. Engineer Dist., Savannah, Ga. DA-CA21-68-C-0045.

12—**Eugene Luhr & Co., and the Pine Bluff Sand & Gravel Co.**, Pine Bluff, Ark. $1,950,350. Construction of dredging for navigation channel in Pool No. 7, Arkansas River Navigation Project. Conway, Perry, Faulkner and Pulaski Counties, Arkansas. Engineer Dist., Little Rock, Ark. DA-CW03-68-C-0052.

—**AVCO Corp.**, Stratford, Conn. $5,078,839. Spare parts for T-55-1-11 engines for CH-47 helicopters. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-67-C-2292.

—**Bell Aerospace Corp.**, Wheatfield, N.Y. $1,380,000. Three air cushion vehicles. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-68-C-0656.

13—**Philco-Ford Corp.**, Philadelphia, Pa. $1,273,500. Engineering changes in connection with Secure Voice Access System. Electronics Command, Fort Monmouth, N.J. DA-AB07-67-C-0153.

14—**Pace Corp.**, Memphis, Tenn. $3,728,535. Illumination signals. Camden, Ark. Picatinny Arsenal, Dover, N.J. DA-AA21-68-C-0543.

15—**Barter Engineering Corp.**, Harrisburg, Ill. $7,678,793. Construction and excavation work on the Rend Lake Reservoir project. Franklin and Jefferson Counties, Ill. Engineer Dist., St. Louis, Mo. DA-CW43-68-C-0091.

—**Oman Construction Co.**, Nashville, Tenn. $1,479,950. Clearing and stripping an embankment and construction of a temporary coffer dam at the Laurel River Reservoir Project. Laurel and Whitley Counties, Ky. Engineer Dist., Nashville, Tenn. DA-CW62-68-C-0111.

—**Mike Hooks, Inc.**, Lake Charles, La. $1,447,540. Dredging, construction and appurtenant work for the Calcasieu River and Navigation Channel Project. Cameron Parish, La. Engineer Dist., New Orleans, La. DA-CW29-68-C-0149.

—**Eugene Luhr & Co.**, Columbia, Ill., and **Midwest Construction Co.**, Nebraska City, Neb. $1,504,314. Work on the Snake Creek embankment, Cole Harbor, N.D. DA-CW45-68-C-0096.

—**Watson Automotive Equipment Co.**, Detroit, Mich. $1,070,304. 150 ambulance-automobiles. Kosciusko, Miss. Tank Automotive Command, Warren, Mich. DA-AE07-68-C-1728.

—**Allis Chalmers Mfg. Co.**, York, Pa. $3,206,770. Turbines for the Dworshak Dam and Reservoir project. Engineer Dist., Walla Walla, Wash. DA-CW68-68-C-066.

18—**AVCO Corp.**, Stratford, Conn. $2,688,400. Gas turbine engine components for the UH-1 aircraft. Aviation Materiel Command, St. Louis, Mo. F-41-608-67-A-3234.

—**Chandler Evans, Inc.**, West Hartford, Conn. $2,512,104. Main fuel controls for UH-1 aircraft. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-67-A-0008.

—**Hughes Tool Co.**, Culver City, Calif. $1,148,056. Transmission assemblies for OH6A helicopters. Aviation Materiel Command, St. Louis, Mo. DA-23-204-AMC-03697.

19—**Hercules, Inc.**, Wilmington, Del. $9,360,000. Loading, assembling and packing mines. Magna, Utah. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0370.

—**AVCO Corp.** Stratford, Conn. $3,604,574. Spare parts for CH-47 belicopter engines. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-67-C-2292.

—**Magnavox Co.**, Fort Wayne, Ind. $1,522,600. Radio sets and related maintenance kits. Electronics Command, Fort Monmouth, N.J. F-34-601-68-A-1489.

20—**R. B. Burch, Inc.**, Cedar Rapids, Iowa. $3,998,434. County road relocation in Appanoose, Lucas and Wayne Counties, Iowa. Engineer Dist., Kansas City, Mo. DA-CW41-68-C-0120.

—**Westinghouse Electric**, Birmingham, Ala. $2,766,907. Design, manufacture, delivery, installation and testing of KVA alternating current generators and appurtenances. Pittsburgh, Pa. and Benton, Ala. Engineer Dist., Mobile, Ala. DA-CW01-68-C-0075.

—**Norris Industries**, Everett, Mass. $1,777,279. 66mm rocket launchers. Brockton, Mass. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-67-C-0338.

—**Lockheed Aircraft**, Burbank, Calif. $1,500,000. Ground support equipment for AH56A helicopters. Van Nuys, Calif. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-68-C-1749.

—**Raytheon Co.**, Lexington, Mass. $1,146,650. 750-lb. bomb tail fuzes. Bristol, Tenn. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0027.

21—**General Electric**, Burlington, Vt. $2,972,517. Spare parts for the XM12 armament pod and the M61A1 gun. Army Procurement Agency, New York, N.Y. DA-AF03-67-C-0016.

—**Jackes-Evans Mfg. Co.**, St. Louis, Mo. $2,948,990. 7.62mm ammunition links. Army Procurement Agency, Chicago, Ill. DA-AG11-68-C-1152.

—**Stewart Avionics, Inc.**, Brooklyn, N.Y. $2,237,721. Maintenance of truck mounted shop equipment. Mobility Equipment Command, St. Louis, Mo. DA-AK01-68-C-6230.

—**United Ammunition Container Corp.**, Philadelphia, Pa. $1,930,320. Ammunition fiber containers for 105mm projectiles. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0360.

—**Consolidated Box Co.**, Tampa, Fla. $1,915,200. Ammunition fiber containers for 105mm projectiles. Ammunition Procurement and Supply Agency, Joliet, Ill. DA-AA09-68-C-0361.

—**Dyer & Dyer, Inc.**, Elizabethtown, Ky. $1,221,825. Construction of flood protection work at the Frankfort, Ky., local protection project. Engineer Dist., Louisville, Ky. DA-CW27-68-C-0127.

—**San Ore-Gardner**, Houston, Tex. $1,072,427. Construction of a marine terminal administration and storage buildings, reinforced concrete wharf and other appurtenant work at Pine Bluff, Ark. Engineer Dist., Little Rock, Ark. DA-CW03-68-C-0056.

22—**Northrop-Carolina, Inc.**, Ashville, N.D. $4,440,800. CS-1 riot control agent. Swannonoa, N.C. Edgewood Arsenal, Md. DA-AA15-68-C-0482.

—**General Electric**, Burlington, Vt. $4,092,000. 20mm anti-aircraft artillery systems. Procurement Agency, New York, N.Y. DA-AG25-68-C-0919.

—**Eastman Kodak Co.**, Rochester, N.Y. $6,556,994. Manufacture of explosives and maintenance of facilities. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-11-173-AMC-00035 (A).

—**Batesville Mfg. Co.**, Batesville, Ark. $2,395,800. 750-lb. bomb nose fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0053.

—**Lear Siegler, Inc.**, Anaheim, Calif. $2,168,436. Metal parts for artillery shell fuze components. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0376.

—**R. C. Can Co.**, Hazlewood, Mo. $1,965,600. Fiber ammunition containers for 105mm projectiles. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-00377.

—**National Presto Industries, Inc.**, Eau Claire, Wis. $1,299,734. Facilities for manufacturing metal parts for M106 8-inch shells. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-67-C-0341.

—**Wells Marine**, El Segundo, Calif. $1,155,000. Metal parts for various types of components for artillery shell fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0356.

—**National Union Electric Corp.**, Bloomington, Ill. $1,052,295. 750-lb. bomb noze fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0256.

25—**Mason & Hanger, Silas Mason Co.**, New York, N.Y. $13,695,853. Loading, assembling and packing of medium and large caliber ammunition, components and mines. Burlington, Iowa. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-11-173-AMC-00085(A).

—**Philco-Ford Corp.**, Philadelphia, Pa. $1,000,000. Classified electronics equipment. Electronics Command, Fort Monmouth, N.J.

—**Atlantic Gulf & Pacific Co.**, New York, N.Y. $1,039,884. Maintenance dredging of material from the Port Arthur Canal and Lower Reach of the Sabine-Neches Canal. Jefferson County, Tex. Engineer, Dist., Galveston, Tex. DA-CW64-68-C-0094.

—**General Motors**, Detroit, Mich. $9,202,622. Metal parts for 105mm projectiles. St. Louis, Mo. Ammunition Procurement & Supply Agency, Joliet, Ill. DA-AA09-68-C-0066.

—**Bell Aerospace Corp.**, Fort Worth, Tex. $10,727,908. AH-1G helicopters. Hurst, Tex. Aviation Materiel Command, St. Louis, Mo. DA-AJ01-C-0043.

—**Cumerford Mfg. Co.**, Anaheim, Calif. $1,343,250. 7.62mm links. Frankford Arsenal, Philadelphia, Pa. DA-AA25-68-C-0461.

—**Borg Warner Corp.**, Bellwood, Ill. $1,116,900. 7.62mm links. Frankford Arsenal, Philadelphia, Pa. DA-AA25-68-C-0535.

26—**Trinity Construction Co.**, Houston, Tex. $1,312,521. Flood control work on the Vince and Little Vince Bayou Project. Harris County, Tex. Engineer Dist., Galveston, Tex. DA-CW64-C-0095.

—**Mine Safety Appliances Co.**, Pittsburgh, Pa. $1,300,000. Riot control agent masks. Edgewood Arsenal, Edgewood, Md. DA–AA15–68–C–0486.

—**Northrop Corp.**, Anaheim, Calif. $1,181,781. 152mm canisters. Picatinny Arsenal, Dover, N.J. DA–AA21–68–C–0764.

27—**Grand Machining Co.**, Detroit, Mich. $1,529,409. M149 fin assemblies for the 81mm mortar. Vero Beach, Fla. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0039.

—**General Motors**, Cleveland, Ohio. $1,842,423. Spare parts for M551 vehicles. Army Weapons Command, Rock Island, Ill. DA–11–199–AMC–00610 (W).

—**Sylvania Electric Products, Inc.**, Mountain View, Calif. $2,500,000. Classified electronic equipment. Central Procurement Activity, Vint Hill Farms Station, Warrenton, Va. DA–HC07–68–C–0166.

—**General Motors**, Indianapolis, Ind. $3,555,525. XTE-250-1A transmissions with spare parts for M551 vehicles. Tank Automotive Command, Warren, Mich. DA–AE07–68–C–0442.

—**Atlantic Gulf & Pacific Co.**, New York, N.Y. $1,162,988. Maintenance dredging of the Houston, Tex., ship channel. Engineer Dist., Galveston, Tex. DA–CW64–68–C–0096.

—**AVCO Corp.**, Stratford, Conn. $1,071,785. Technical publications in support of T55 and T53 turbine aircraft engines. Aviation Materiel Command, St. Louis, Mo. DA–AJ01–68–C–1131.

—**Colt's, Inc.**, Hartford, Conn. $1,081,728. 20-round magazine assemblies in support of the M16 weapons family. Army Weapons Command, Rock Island, Ill. DA–AF03–68–C–0049.

28—**Philco-Ford Corp.**, Newport Beach, Calif. $1,753,999. Shillelagh engineering services. Army Missile Command, Huntsville, Ala. DA–04–495–AMC–00556 (Z).

—**Muncie Gear Works**, Muncie, Ind. $3,351,500. Fin and nozzle assemblies for 2.75-inch rockets. Picatinny Arsenal, Dover, N.J. DA–AA21–68–C–0782.

—**Hendry Corp.**, Tampa, Fla. $1,280,165. Clearing and dredging work in the Alabama River Channel. Engineer Dist., Mobile, Ala. DA–CW01–68–C–0081.

—**Colts, Inc.**, Hartford, Conn. $1,249,132. Sixty-six line items of repair parts for M16 weapon family. Army Weapons Command, Rock Island, Ill. DA–AF03–68–C–0051.

29—**Alleghany Ludlum Steel Corp.**, Pittsburgh, Pa. $1,023,207. 2,026,152 lbs. of bullet jacket cup gilding metal clad steel for 7.62mm ball ammunition, M80 and/or 30 cal. ball (M2) ammunition. Frankford Arsenal, Philadelphia, Pa. DA–AA25–68–C–0247.

—**Raytheon Co.**, Lexington, Mass. $1,956,460. Self-propelled Hawk missile system ground support equipment. Andover, Mass. and Bristol, Tenn. Army Missile Command, Huntsville, Ala. DA–AH01–67–C–A024.

—**Teletype Corp.**, Skokie, Ill. $1,500,000. Classified electronics equipment. Electronics Command, Fort Monmouth, N.J.

—**Motorola, Inc.**, Scottsdale, Ariz. $2,000,000. Classified electronics equipment. Electronics Command, Fort Monmouth, N.J.

—**Philco-Ford Corp.**, Philadelphia, Pa. $3,196,006. Three months maintenance and operation services for the Integrated Wide Band Communication Sites in Southeast Asia. Electronics Command, Fort Monmouth, N.J. DA–28–043–AMC–01694 (E).

—**Honeywell, Inc.**, Tampa, Fla. $2,124,670. Multiplexers and related spare parts kits. Electronics Command, Philadelphia, Pa. DA–AB05–67–C–1225.

—**Cummins Engine Co.**, Columbus, Ind. $1,048,510. Tank Automotive Command, Warren, Mich. DA–AE07–67–C–5022.

—**Continental Motors**, Muskegon, Mich. $10,079,764. AVDS1790 engine assemblies. Tank Automotive Command, Warren, Mich. DA–AE07–68–C–0407.

—**American Hoist & Derrick Co.**, St. Paul, Minn. $14,459,620. Wheel mounted, 20-ton cranes. Bay City, Mich and Fort Wayne, Ind. Mobility Equipment Command, St. Louis, Mo. DA–AK01–68–C–6809.

—**Wisconsin Motor Corp.**, Milwaukee, Wis. $7,148,991. Ten and twenty horsepower military standard gasoline engines. Mobility Equipment Command, St. Louis, Mo. DA–HC60–68–C–0017.

—**Western Electric**, New York, N.Y. $85,480,628. Initial production of the Sentinel anti-ballistic missile system. Sentinel System Command, Huntsville, Ala. DA–HC60–68–C–0017.

—**General Dynamics**, Pomona, Calif. $3,479,000. XM49-E3 trainers for the Redeye missile system. Army Missile Command, Huntsville, Ala. DA–AH01–68–C–1582.

—**Kaiser Jeep Corp.**, Toledo, Ohio. $34,207,590. Five-ton trucks. South Bend, Ind. DA–AE06–68–C–0012; $7,451,687. 1¼-ton trucks. Project Manager, General Purpose Vehicle Agency, Warren, Mich. DA–20–113–AMC–10235.

—**Mack Trucks**, Allentown, Pa. $8,278,908. Diesel engines for five-ton trucks. Hagerstown, Md. Project Manager, General Purpose Vehicle Agency, Warren, Mich. DA–AE06–68–C–0010.

—**Sullivan Township Road Dist.**, Sullivan, Ill. $1,100,000. Work on the Shelbyville Reservoir, Moultrie County, Ill. Engineer Dist., St. Louis, Mo. DA–CW43–68–C–0102.

—**General Motors**, Indianapolis, Ind. $1,158,000. Production improvement program for the T-63-A-5A engine for OH-6A helicopters; DA–AJ01–67–C–1762; $1,579,240. T-63-A-5A engines. DA–AJ01–68–C–1333. Aviation Materiel Command, St. Louis, Mo.

—**AVCO Corp.**, Stratford Conn. $1,087,887. Technical non-personnel services and supplies for CY 1968, T-55 engine product improvement program. DA–AJ01–68–C–1543; $2,582,000. Product support and component improvement program for T-53 engines. DA–AJ01–68–C–1546; $15,871,701. T-53 engines. DA–AJ01–67–C–0647. Aviation Materiel Command, St. Louis, Mo.

—**Bell Helicopter**, Fort Worth, Tex. $8,121,517. Rotary wing blades and associated parts, and main blade assemblies for UH-1 helicopters. Hurst, Tex. Aviation Materiel Command, St. Louis, Mo. DA–AJ01–68–A–0022.

—**Hercules, Inc.**, Wilmington, Del. $14,361,873. Production of propellant for 2.75-inch rockets and maintenance of production facilities at the Sunflower Ammunition Plant, Lawrence, Kan. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–11–173–AMC–0042 (A).

—**Appalachian Power Co.**, New York, N.Y. $1,620,000. Operation of a facility for power to support production requirements at the Radford, Va., Army Ammunition Plant. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–11–173–AMC–00134 (A).

—**Norris Industries**, Los Angeles, Calif. $1,181,650. Metal parts for 81mm mortar projectiles. Riverbank, Calif. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0304.

—**Lehigh, Inc.**, Easton, Pa. $2,499,910. Metal parts for high explosive warheads for 2.75-inch rockets. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0200.

—**Olin Mathieson Chemical Co.**, East Alton, Ill. $1,839,178. 81mm illuminating projectiles. Marion, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–51.

—**Bell & Howell Co.**, Chicago, Ill. $1,174,758. Metal parts for 81mm illuminating projectiles. Evanston, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0047.

—**Kisco Co.**, St. Louis, Mo. $6,457,500. Metal parts for 105mm cartridges. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0108.

—**Bulova Watch Co.**, Flushing, N.Y. $5,196,800. Mechanical time fuzes (M565). Ammunition Procurement & Supply Agency, Joliet, Ill. DA–11–173–AMC–00315 (A).

—**General Instrument Corp.**, Chicopee, Mass. $2,090,000. Metal parts for bomb tail fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0086.

—**Delaware Valley Armaments**, Mt. Laurel, N.J. $1,296,000. Metal parts for point detonating fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0204.

—**National Union Electric Corp.**, Bloomington, Ill. $1,392,650. Metal parts for 750-lb. bomb nose fuzes. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–68–C–0386.

—**National Presto Industries**, Eau Claire, Wis. $9,855,441. Metal parts for eight-inch high explosive projectiles. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–11–173–AMC–820 (A).

—**Atlantic Research Corp.**, West Hanover, Mass. $3,000,000. Incorporation of a new design for the explosive opener assembly on a mine system. Ammunition Procurement & Supply Agency, Joliet, Ill. DA–AA09–67–C–0323.

DEPARTMENT OF THE NAVY

1—**Sanders Associates**, Nashua, N.H. $8,000,000. Electronic equipment. Naval Air Systems Command. NOw 66–0356.

—**Garrett Corp.**, Phoenix, Ariz. $4,664,400. T76-G-10/12 engines and special support equipment. Naval Air Systems Command. NOw 65–0167.

—**Treadwell Corp.**, New York, N.Y. $2,798,115. Oxygen generators, related technical services and data. Naval Ship Systems Command. N00024–68–C–5212.

—**Consolidated Diesel Electric Co.**, Old Greenwich, Conn. $1,410,750. Aircraft spotting dollies. Naval Air Systems Command. N00019–68–C–0394.

4—**Harvey Aluminum Co.**, Torrance, Calif. $1,584,000. WETEYE bombs. Naval Air Systems Command. N00019–68–C–0325.

5—**Western Electric**, New York, N.Y. $1,211,865. Production of Tartar weapon direction equipment. Burlington, N.C. Naval Ordnance Systems Command. N00017–68–C–2310.

6—**Ingalls Shipbuilding Corp.**, Pascagoula, Miss. $113,072,000. Design and construction of four ammunition ships. Naval Ship Systems Command. N00024–68–C–0287.

—**Cubic Corp.**, San Diego, Calif. $3,750,000. Classified electronic equipment. Naval Ship Systems Command. N00024–68–C–1179.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $1,720,999. TC-4C aircraft. Naval Air Systems Command. N00019–67–C–0180.

7—**Aerojet-General Corp.**, Azusa, Calif. $12,000,000. MK 46 MOD 1 torpedoes and associated equipment. Naval Ordnance Systems Command. N00017–67–C–1108.

—**Sperry Rand Corp.**, St. Paul, Minn. $2,712,203. Data processing sets. Naval Ship Systems Command. N00024–68–C–1184.

—**Bendix Corp.**, Teterboro, N.J. $1,779,835. Autopilot systems. Naval Air Systems Command. N00019–68–C–0275.

—**Philco-Ford Corp.**, Fort Washington, Pa. $1,080,000. Improvement of maintainability and reliability of sonor equipment. Naval Ship Systems Command. N00024–68–C–1132.

—**Northrop Corp.**, Hawthorne, Calif. $1,024,240. Airborne Omega receiver navigation sets. Naval Air Systems Command. N00019–68–C–0355.

8—**Logicon, Inc.**, San Pedro, Calif. $3,691,611. Development of a prototype computerized Airborne Tactical Data System program for the Fleet Computer Program Center, Pacific, San Diego, Calif. Navy Purchasing Office, Los Angeles, Calif. N00123–68–C–0091.

—**Raytheon Co.**, Lexington, Mass. $2,969,713. MK 42 MOD 0 firing mechanisms. Bristol, Tenn. Naval Ordnance Systems Command. N00017–68–C–1415.

—**Rodale Electronics**, Garden City, N.Y. $1,118,700. Telemetric transmitting sets for testing surface-to-air missiles. Naval Avionics Facility, Indianapolis, Ind. N00163–68–C–0488.

11—**Hughes Aircraft**, Culver City, Calif. $13,324,000. Phoenix missiles and associated equipment. Naval Air Systems Command. N00019–68–C–0295.

—**General Dynamics,** Pomona, Calif. $5,000,000. Increase to the limitation of authorization for the Standard Arm missile system. Naval Air Systems Command. N00019-67-C-0399.

—**Poloron Products,** New Rochelle, N.Y. $2,105,321. MK 82 bomb fin assemblies. Scranton, Pa. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Dayton T. Brown, Inc.,** Bohemia, N.Y. $2,004,410. Preproduction and production lot sample testing of armament equipment. Naval Air Systems Command. N00019-68-C-0324.

12—**Raytheon Co.,** Sudbury, Mass. $4,805,072. Polaris MK 2 guidance alteration kits and electronic assemblies. Waltham, Mass. Special Projects Office. N00030-68-C-0214.

—**Lockheed Missiles & Space Co.,** Sunnyvale, Calif. $456,137,563. Development and production of Poseidon (C-3) missile system. Special Projects Office.

13—**United Aircraft,** Hartford, Conn. $45,696,445. Product support engineering for TF30, J34, J48, TF33/JT3D, J52, J57/JT3, and J75/JT34 engines. Naval Air Systems Command.

—**U.S. Steel,** Pittsburgh, Pa. $13,246,620. MK 82 bomb bodies. McKeesport, Pa. Navy Ships Parts Control Center, McKeesport, Pa.

—**Vitro Corp.,** Silver Spring, Md. $3,989,995. Fleet ballistic missile program system engineering. Special Projects Office. N0030-68-C-0009.

—**Bendix Corp.,** Mishawaka, Ind. $1,968,000. Engineering and development of Talos RIM-8 and Talos ARM missiles and associated production, and tactical test equipment. Naval Ordnance Systems Command. N00017-68-C-4302 G8-0622-017.

—**Curtiss-Wright Corp.,** Wood-Ridge, N.J. $1,486,546. Product support engineering services for J65 engines. Naval Air Systems Command. N00019-68-C-0140.

—**Aqua-Chem, Inc.,** Waukesha, Wis. $1,360,912. Distilling units, repair parts, engineering services and technical data. Naval Ship Systems Command. N00024-68-C-5291.

14—**Norfolk Shipbuilding & Dry Dock Corp.,** Norfolk, Va. $3,420,000. Conversion of the Auxiliary Repair Drydock, ARD 18. Chesapeake, Va. Naval Ship Systems Command. N00024-68-C-0317.

—**Sylvania Electric Products,** Waltham, Mass. $1,063,693. 360-degree antennae. Naval Electronic Systems Command. N00039-68-0526.

15—**Texas Instruments,** Dallas, Tex. $5,371,061. Shrike missile guidance and control sections with wings and fins. Naval Air Systems Command. N00019-68-C-0069.

—**Litton Systems,** Van Nuys, Calif. $3,658,652. Service test digital transmission and switching system. Naval Electronic Systems Command. N00039-68-C-0527.

—**General Precision,** San Marcos, Calif. $2,549,626. Design and development of an emitter-receiving system for support of the electronic emitter location system used aboard aircraft. Navy Purchasing Office, Los Angeles, Calif. N00123-67-C-3010.

—**Atlas Fabricators,** Long Beach, Calif. $2,250,930. Steel storage boxes for small arms ammunition. Navy Ships Parts Control Center, Mechanicsburg, Pa. N00104-68-C-5335.

—**Roebbelen Construction** Co., Sacramento, Calif. $1,175,000. Construction of two run-up shops, a service shop and a storage base for special liquid for the SAC missile facility, Castle AFB, Calif. Western Div., Naval Facilities Engineeering Command, San Bruno, Calif.

—**United Aircraft,** Stratford, Conn. $1,200,000. Increase of long lead time funding for HH-3F helicopters. Naval Air Systems Command. N00019-67-C-0141.

—**Teledyne Systems,** El Segundo, Calif. $1,167,450. Equipment to support the navigational computer system used on A-7A/B aircraft. Aviation Supply Office, Philadelphia, Pa. N00383-68-C-4400.

18—**Grumman Aircraft Engineering Corp.,** Bethpage, N.Y. $5,961,000. Incremental funding for the EA-6B aircraft program. Naval Air Systems Command. N00019-67-C-0078.

19—**General Electric,** Syracuse, N.Y. $1,969,668. Radar course directing equipment. Naval Electronic Systems Command. N00039-68-C-0530.

—**Sperry Rand Corp.,** St. Paul, Minn. $1,343,000. Computers, motor generator sets, and recorder-reproducer equipment. Naval Ship Systems Command. N00024-68-1028.

—**Bethlehem Steel,** Terminal Island, Calif. $1,256,227. Conversion of mechanized landing craft to command communication boats. Supervisor of Shipbuilding, 11th Naval Dist., Long Beach, Calif. IFB N62791-68-B-0082.

20—**Swenson Co., Inc.,** San Jose, Calif. $5,628,000. Construction of a building addition at the Air Force Satellite Test Center, Sunnyvale, Calif. Western Div., Naval Facilities Engineering Command, San Bruno, Calif. NBy-77748.

—**United Aircraft,** East Hartford, Conn. $1,188,518. Spare parts for F-9F aircraft engines. Aviation Supply Office, Philadelphia, Pa. N00383-8-69000a-AF140.

—**Stanwick Corp.,** Washington, D.C. $1,136,487. Develop and analyze managements information products for Fleet Type Commanders. Arlington, Va. Naval Ship Systems Command. N00024-68-C-5053.

21—**Electronics Communications, Inc.,** St. Petersburg, Fla. $20,769,000. Manufacture of AN/SRC-27 radio sets. Naval Electronic Systems Command. N00039-68-C-1550.

22—**George A. Fuller Co.,** Atlanta, Ga. $3,856,000. Construction of two missile assembly and packaging buildings at the Naval Weapons Station, Charleston, S.C. Southeast Div., Naval Facilities Engineering Command, Charleston, S.C. NBy-88739.

—**F. D. Rich Co.,** Stamford, Conn. $1,458,000. Construction of an aircraft overhaul and repair shop at the Naval Air Station, Quonset Point, R.I. Northeast Div., Naval Facilities Engineering Command, Boston, Mass. NBy-83480.

—**H. Kooch & Sons, Inc.,** Corte Madera, Calif. $1,325,181. Lap belt section of parachutes. Naval Aviation Supply Office, Philadelphia, Pa. N00383-68-C-4423.

—**Norge Associates,** Sea Cliff, N.Y. $1,181,890. Construction of barracks at the Naval Construction Battalion Center, Davisville, R.I. Northeast Div., Naval Facilities Engineering Command, Boston, Mass. NBy-83518.

25—**American Machine & Foundry Co.,** York, Pa. $28,094,091. MK 82 bomb bodies. Naval Supply Systems Command. N00104-68-C-0715 P008.

—**General Dynamics,** Pomona, Calif. $2,800,000. Terrier/Tartar ordnance alterations. Naval Ordnance Systems Command. N00017-68-C-2108 08-0622-037.

—**Raytheon Co.,** Portsmouth, R.I. $1,679,907. Conduct of a submarine integrated systems engineering study. Naval Ship Systems Command. N00024-68-C-1210.

—**Kaiser Aerospace & Electronics Corp.,** Palo Alto, Calif. $1,226,542. Components of the AN/AVA-1 radar system used on A-6A and EA-6A aircraft. Aviation Supply Office, Philadelphia, Pa. N00383-68-A-1801-0009.

—**Lockheed Aircraft,** Plainfield, N.J. $1,138,150. Design, development and engineering improvement for Gun Fire Control System, MK 86 MOD 0, and related equipment. Metuchen, N.J. N00017-67-C-2308 8-0257-109.

—**Bendix Corp.,** North Hollywood, Calif. $1,032,381. Redesign of component parts of the MK 46 torpedo guidance and control system. Navy Purchasing Office, Los Angeles, Calif. N00123-68-C-1374.

26—**LTV Aerospace Corp.,** Dallas, Tex. $18,093,585. A-7E aircraft. Naval Air Systems Command. N00019-68-C-0075.

—**General Dynamics,** Pomona, Calif. $7,100,000. Standard Arm missiles. Naval Air Systems Command. N00019-68-C-0074.

—**United Aircraft,** Norwalk, Conn. $3,942,049. Radar spare parts for A-6A aircraft. Aviation Supply Office, Philadelphia, Pa. N00383-67-A-5506-0176.

—**International Harvester Co.,** San Diego, Calif. $3,150,038. Gas turbine generators. Sunnyvale, Calif. Western Div., Naval Facilities Engineering Command, San Bruno, Calif. N62474-67-C-0255.

—**United Aircraft,** Hartford, Conn. $1,733,613. General design, development and qualification testing of the TF30-P-7 engine, with preproduction ejector assembly kits. N00019-68-C-0440; $1,533,658. General design and development of the TF30-P-7 engine for the Air Force. N00019-C-0081. Naval Air Systems Command.

—**Magnavox Co.,** Fort Wayne, Ind. $1,688,285. Classified electronic equipment. Naval Air Systems Command. N00019-68-C-0434.

—**Westinghouse Electric,** Pittsburgh, Pa. $1,034,000. Provide training for the support of the technical and operation evaluation program on the MK 48 MOD 0 torpedo weapon system (services). Key Port, Wash. Naval Ordnance Systems Command. N00017-68-C-1214.

28—**Harvey Aluminum, Inc.,** Torrance, Calif. $11,584,178. AM-2 airfield aluminum landing mats and pallet assemblies. Naval Air Engineering Center, Philadelphia, Pa. N00156-68-C-1668.

—**Computer Sciences Corp.,** El Segundo, Calif. $5,799,885. Computer programs for the Naval Tactical Data System and related items. San Diego, Calif. Navy Purchasing Office, Los Angeles, Calif. N00123-68-C-01614.

—**Raytheon Co.,** Bedford, Mass. $10,575,000. Sparrow III guided missiles and adapters. Lowell, Mass.; Bedford, Mass.; Oxnard, Calif. and Bristol, Tenn. Naval Air Systems Command. N00019-68-C-0386.

—**Goodyear Aerospace Corp.,** Akron, Ohio. $10,498,000. Eight TA-4F aircraft operational flight trainer, Device 2F90 including data and support. Naval Training Device Center, Orlando, Fla.

—**Kaiser Aluminum & Chemical Sales, Inc.,** Halethorpe, Md. $5,997,615. AM-2 airfield aluminum landing mats and pallet assemblies. Naval Air Engineering Center, Philadelphia, Pa. N00156-68-C-1669.

—**Litton Systems, Inc.,** New Rochelle, N.Y. $1,403,471. Three mobile communication centrals. Marine Corps Headquarters.

29—**Litton Systems,** Woodland Hills, Calif. $7,456,952. Equipment pertaining to inertial navigational systems and computer systems. Aviation Supply Office, Philadelphia, Pa. N00383-68-A-1201-0027.

—**North American Aviation, Inc.,** Columbus, Ohio. $3,000,000. OV-10A aircraft. Naval Air Systems Command. NOw 65-0118.

—**Raytheon Co.,** Lowell, Mass. $1,964,346. Guidance and control sections for Sidewinder 1C guided missiles. Naval Air Systems Command. N00019-68-C-0164.

—**LTV Aerospace Corp.,** Dallas, Tex. $1,350,000. A-7E aircraft funding. Naval Air Systems Command. N00019-68-C-0075.

—**Collins Radio Co.,** Richardson, Tex. $1,242,686. Airborne communication sets and related equipment. Naval Air Systems Command. N00019-67-C-0382.

—**General Precision Systems, Inc.,** Little Falls, N.J. $1,251,190. Equipment pertaining to the inertial measurement system used in A-7E aircraft. Aviation Supply Office, Philadelphia, Pa. N383-91017A-AA187.

DEPARTMENT OF THE AIR FORCE

1—**Litton Systems, Ltd.** Rexdale, Ontario, Canada. $3,550,479. Weapons release systems (AN/ASQ-91) applicable to F-4 aircraft. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

4—**United Aircraft,** Windsor Locks, Conn. $1,232,278. Production of replenishment spare parts in support of C-130 aircraft propellers. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga. AF 09603-67-A-0322-0273.

—**Wall Colmonoy Corp.,** San Antonio, Tex. $1,184,667. High temperature furnace braze repair of jet engine hot section parts. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Ga. AF 41608-67-D-5863-0005.

5—**Litton Systems, Ltd.,** Rexdale, Ontario, Canada. $1,012,476. Weapons release systems for the F-4 aircraft. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**United Aircraft of Canada, Ltd.,** Longueuil, Quebec, Canada. $3,050,165. R-4360 aircraft engine spare parts. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex.

6—**North American Aviation, Inc.,** Canoga Park, Calif. $1,000,000. Production of Thor propulsion systems. Space & Missile Systems Organization, (AFSC), Los Angeles, Calif. AF F04701–67–C–0141.

7—**Batesville Mfg. Co.,** Batesville, Ark. $2,233,056. Bomb components. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio. AF F33657–68–C–0850.

8—**Dynamics Corp. of America,** Bridgeport, Conn. $1,546,646. Generator sets. Pasco, Wash. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif. AF 04606–68–D–0575.

12—**Lockheed Aircraft,** Burbank, Calif. $1,494,360. Production of flight hood modification kits for C-121 aircraft. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif. F 04606–68–A–0067.

13—**AVCO Corp.,** Wilmington, Del. $1,687,500. Re-entry vehicles. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex. F 41608–68–C–2207.

—**Sylvania Electric Products,** Waltham, Mass. $1,069,000. Advanced modulation and computer for future radar application. Rome Air Development Center, Griffiss AFB, N.Y. F 30602–68–C–0283.

—**Fairchild Hiller Corp.,** Farmingdale, N.Y. $1,041,000. Electronic modification kits for F-105 aircraft. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif. F 04606–68–J–0009.

18—**AVCO Corp.,** Richmond, Va. $10,095,800. Production of aircraft ordnance fuzes. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio. AF F33657–67–C–0443.

—**Textron, Inc.,** Grants Pass, Ore. $2,544,296. Production of F-4 aircraft ejector racks. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga. AF F9603–68–C–1485.

19—**Goodyear Aerospace Corp.,** Akron, Ohio. $1,495,643. Production of air cargo handling pallets. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

—**Aircraft Hydroforming, Inc.,** Gardena, Calif. $1,225,181. Production of aircraft bomb racks. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

20—**General Motors,** Indianapolis, Ind. $5,644,067. Jet turbine modification kits. Oklahoma City Air Materiel Area, (AFLC), Tinker AFB, Okla. AF 34601–67–A–1594.

—**United Aircraft,** Windsor Locks, Conn. $2,070,710. Modification kits for bomb rack releases in support of B-52 aircraft. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga. AF 09603–67–A–0322.

—**Hughes Aircraft,** Culver City, Calif. $1,825,000. A service test model of an advanced laser reconnaissance set. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio. AF 33657–68–C–0063.

—**North American Aviation,** Los Angeles, Calif. $1,200,000. Production of wing modification kits for F-100 aircraft. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif. AF 04606–67–A–1813.

—**Chromalloy American Corp.,** San Antonio, Tex. $1,175,026. Repair and coating of J57 and J75 compressor blades. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex. AF 41608–68–D–1617–0004.

21—**General Precision Systems, Inc.,** Pleasantville, N.J. $1,016,504. Airborne Electronic equipment for C-7, C-123 and C-130 aircraft. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio. AF 33657–68–C–0924.

25—**Hansel-Phelps Construction Co.,** Greeley, Colo. $1,229,000. Construction and modification of strategic missile support base facilities at Minot AFB, N.D. Engineer Ballistic Missile Construction Office, Norton AFB, Calif. DACA 13–68–C–0001.

26—**Adventure Line Mfg. Co.,** Parson, Kan. $5,440,000. Bomb components. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio. AF 33657–68–C–0778.

Air Force Tests "Instant Playback" Continuous View Radar

Radar that operates similar to the instant replay technique, now used in football television broadcasts, and gives a continuous view of a geographical area is being tested by the Air Force Systems Command's Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio.

Tests are being conducted out of Holloman AFB, N.M., using a KC–135 aircraft for forward-looking radar systems, and a C–141 aircraft for flight-test of precision navigation equipment.

Purpose of the radar tests is to find the best resolution at different speeds, altitudes and ranges.

The new radar has the capability of operating like a zoom lens, a common technique used by television cameramen to film closeup shots. In addition, the equipment can "freeze" a scene so that the operator can precisely locate a particular area.

On-board computers, tied in with the radar equipment, automatically guide an aircraft to a particular target area. Information can be fed to the computers before or during flight, and just before an aircraft reaches a specified area, cross hairs automatically align on the target.

A high-resolution photogrammetric camera, which measures objects as small as seven microns or about four-hundred thousandths of an inch, checks to insure that the area being targeted by the radar is the area originally programmed for location by the equipment.

Equipment from Philco and Autonetics is being tested on the KC–135, while tests of precision navigation will evaluate equipment from General Precision, Inc., AC Electronics, and Autonetics on the C–141.

Purpose of the precision navigation tests is to determine which equipment will best enable an aircraft to fly from one location to another, at different and varying rates of speed, and still enable aircraft personnel to determine exactly where they are.

Army Forms New Tactical Communications Office

The mission of assuring compatibility in development and inter-operation of combat communications systems has been assigned to a new Tactical Communications Systems Office at Headquarters, U.S. Army Electronics Command (ECOM), Fort Monmouth, N.J.

Brigadier General Paul A. Feyereisen has been selected as Deputy Commanding General for Tactical Systems at ECOM, in addition to his responsibility as U.S. program and project manager for the Mallard Project.

Creation of the command position and a specially selected systems engineering staff is the result of a study report. Recommendations resulting from this study recognized the necessity for comprehensive engineering of communications systems to assure effective interface, and development of all communication means as a single integrated tactical communications system.

The central purpose of the Tactical Communications Systems Office will be to assure "coherence and integrity" of tactical communications system engineering for which the Army Electronics Command is responsible. This will involve developing, coordinating, maintaining and monitoring the implementation of integrated tactical communication systems plans.

The new office will work closely with Army Combat Development Command, particularly its Communications-Electronics Agency at Fort Monmouth whose functions include determining the communication needs of the man in the field.

As its name indicates, the Tactical Communications Systems Office will deal primarily with communications employed directly in combat and field operations. However, the drive for greater compatibility extends to better interfaces between tactical and strategic systems, including global communications networks.

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Air Force Adopts Life-Cycle Tire Procurement

Ogden Air Material Area (OOAMA), Hill AFB, Utah, which is responsible for managing all of the Air Force's aircraft tires and tubes, has adopted a new purchasing philosophy.

No longer do experts at OOAMA's Materiel Management and Procurement and Production Directorates look upon tires bought at the lowest competitive bid as necessarily being the cheapest.

This relatively new technique is called "Life Cycle Costing Procurement of Aircraft Tires."

Under the old procedure, OOAMA bought all its tires based on the lowest unit cost quoted by any of the qualified manufacturers. However, under this method it was found that the Air Force was not getting the best dollar value tire in many cases. For example, a tire which met specifications could be bought for $53 and might provide 15 landings. Another qualified tire costing $54 would give 25 landings. Thus to buy the higher priced tire was found to be more economical since cost per landing is reduced. Other costs, such as shipping, storage and maintenance, are also cut proportionately, because fewer tires need be purchased.

Now being fully tested in the field, the new tire-buying concept takes into account such factors as temperature, weather, runway and taxiway surfaces, aircraft weight and pilot techniques. These and other factors are compiled into a landing index which is based on the performance of the tires in actual use. This index is coordinated with the manufacturer for his concurrence.

The next invitation for bid (IFB) on these tires specifies the landing index. The IFB also lists shipping and maintenance costs, also used in the bid evaluation to determine the lowest cost-per-landing tire.

Accompanying the new procurement procedure is a new reporting method. The system provides actual performance data on each tire by size, application and manufacturer. This gives a constant follow-up on tire performance.

Services Agree to Common Electronic Installation Standards

An agreement, designed to bring about coordination among the electronics engineering and installation agencies of the respective Military Departments, has been signed by representatives of the Army, Navy and Air Force.

Tri-Service working groups will be established to seek solutions to problems of mutual concern, to develop common installation standards beneficial to all Military Departments, and to insure that system flexibility is engineered into major systems of common concern.

Each Military Department will be delegated detailed procurement, engineering, and installation responsibilities for its part of each program of mutual interest. The increased coordination is intended to prevent extensive duplication of effort, and improve technical management of the programs.

One of the advantages of the team effort is the much more favorable buying position resulting from consolidation of requirements. In effect, combined shopping lists will be prepared for equipment and services needed under the communications-electronics program.

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